SANDIA REPORT

SAND95-0724 UC-900
Unlimited Release
Printed May 1995

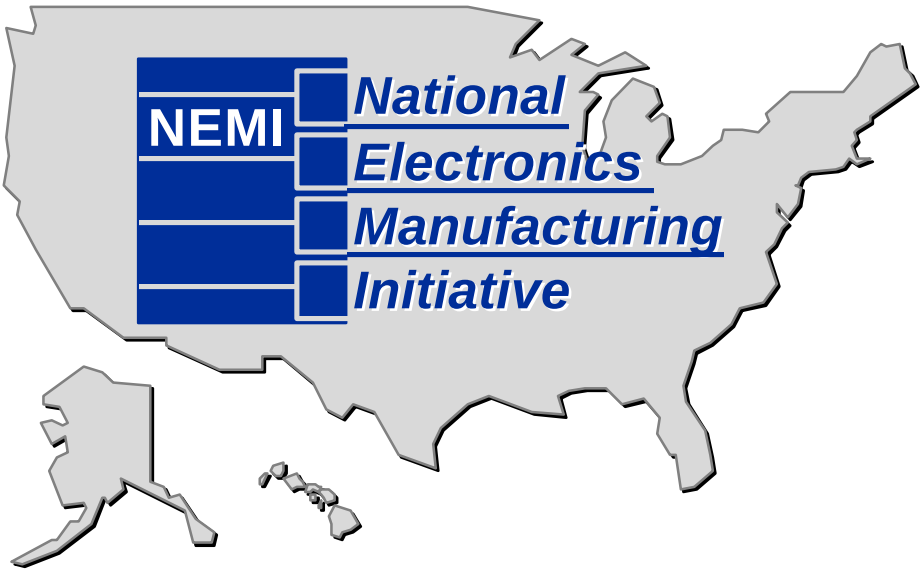
PROSPERITY GAME FOR THE NATIONAL ELECTRONICS MANUFACTURING INITIATIVE

Marshall Berman (Sandia National Laboratories)
Ivan Berry (Microelectronics Research Laboratory)
J. Pace VanDevender (Sandia National Laboratories)

Prepared by
Sandia National Laboratories
Albuquerque, New Mexico 87185 and Livermore, California 94550
for the United States Department of Energy
under contract DE-AC04-94AL85000

Prosperity Games

for the



September 7-9, 1994

Produced by the Department of Energy's
Sandia National Laboratories

in collaboration with the Naval War College, Lawrence Livermore National Laboratory, the Electronic Industries Association, the Institute for Interconnecting and Packaging Electronic Circuits, and the American Electronics Association

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September 7-9, 1994
Mt. Weatherall, Virginia

by

Marshall Berman
Sandia National Laboratories

Ivan Berry
Microelectronics Research Laboratory

and
J. Pace VanDevender
Sandia National Laboratories

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ABSTRACT

Prosperity Games are an outgrowth and adaptation of move/countermove and seminar War Games. Prosperity Games are simulations that explore complex issues in a variety of areas including economics, politics, sociology, environment, education and research. These issues can be examined from a variety of perspectives ranging from a global, macroeconomic and geopolitical viewpoint down to the details of customer/supplier/market interactions in specific industries. All Prosperity Games are unique in that both the game format and the player contributions vary from game to game.

This report documents the Prosperity Game conducted under the sponsorship of the Electronics Subcommittee of the Civilian Industrial Technology Committee (under the National Science and Technology Council), and the Electronics Partnership Project. Players were drawn from the electronics industry, from government, national laboratories, and universities, and from Japan and Austria. The primary objectives of this game were:

- To connect the technical and non-technical (i.e., policy) issues that were developed in the roadmap-making endeavor of the National Electronics Manufacturing Initiative (NEMI);
- To provide energy, enthusiasm and people to help the roadmap succeed; and
- To provide insight into high-leverage public and private investments.

The deliberations and recommendations of these teams provide valuable insights as to the views of this diverse group of decision makers concerning policy changes, foreign competition, the robustness of strategic thinking and planning, and the development, delivery and commercialization of new technologies.

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EXECUTIVE SUMMARY

Prosperity Games are high-level interactive forums for exploring complex issues in a gaming environment. They have been adapted from War Games and greatly extended to address a broad range of policy and technology issues. Recent games have addressed electronics manufacturing, industry-government interactions, and international competitiveness. Future games are planned in the areas of education, environment, business, information infrastructure, health, diversity, and cultural change. These games provide opportunities for exploring current situations while simultaneously creating and studying other possible realities.

Every Prosperity Game is unique; each is defined by its objectives, game format, and players. Prosperity Games are very effective learning tools. Enthusiasm and learning exceed the classical seminar or workshop environment because: The games are highly interactive (multi-way communication versus one-way transfers in seminars); they simulate reality; create opportunities to develop personal and business relationships; bring conflict to the surface and force players to manage it; afford an opportunity for diversity among players and roles to enhance understanding, empathy, and creativity; and they encourage teaming and win-win problem solving.

This is the sixth Prosperity Game that has been conducted. It was held in conjunction with the roadmap-making effort of the National Electronics Manufacturing Initiative (NEMI) of the Electronics Subcommittee of the Civilian Industrial Technology Committee. The game focused on competitiveness in electronics manufacturing. Its objectives were to connect technical and non-technical policies; provide energy, enthusiasm and players to help the NEMI roadmap endeavor; and to provide insight into high-leverage public and private investments.

Fifty-one players and forty-two staff participated in the game. Players came from US industry, government, national labs and universities, with two representatives from Japan and two from Austria.

The game scenario focused on an imaginary electronics product called SAMSON, a high-tech personal communicator/entertainment/ computer device. Although a current version of SAMSON exists, the final lightweight, portable advanced product will require hundreds of millions of dollars to commercialize. The current product is being developed and manufactured or imported by three companies, one US, one European, and one Japanese. The SAMSON product also has military applications and is viewed by the US Administration as being strategically important. The product is in the middle stage of development, but several key technologies need major innovation for the advanced technology to be successfully commercialized.

The scenario set the stage for interactions and negotiations among nine original teams: one major product manufacturer, a supplier, and a government team for three regions: the US, Japan and Europe. Three additional teams were created over the course of the game representing universities, the Ukrainian government, and Rootska, a Ukrainian company. The Green Team (or Control) played all other roles that were needed in the game.

The teams were given descriptions of their current status (business, technical, competition, policy issues, resources, etc.) and a set of key challenges. The challenges included technology needs such as automated assembly and packaging, improved displays and software, wireless technology, sensors, and lower power operation. Policy and political challenges involved location of production, intellectual property rights, trade, taxes, cost

of capital, environment, education, industry-government relations, productivity, and international competitiveness.

The game introduced the concept of a "Toolkit." This was a collection of the technology and policy options developed in previous NEMI roadmap-making exercises. The game afforded the players an opportunity to evaluate the various options in the context of the game simulation and invest (solely or in partnerships) in those options deemed most important to their teams. The influence of each team was made proportional to their real-life influence, and was measured in dollars. Success or failure of these investments was determined probabilistically, with success probability increasing with the amount invested.

Nine technology options succeeded in the first round, with six involving substantial investments of three or more teams. These were in the areas of robotics, packaging, rapid prototyping, substrates, high-resolution 3-D flat panel displays, and non-invasive neural based input-output for SAMSON.

The US Government invested heavily in policy options dealing with NEMI, industry-government-laboratory partnerships, workforce training, curbing abusive shareholder suits, and replacing the income tax with a consumption tax (their own idea, and not derived from the NEMIroadmap).

The Japanese Government Team invested all their funds in their own policy options. In contrast, the European government invested most of its money in technology, and nothing in policy options.

A mock economic summit was held. The Japanese Team focused on education, but its proposals were met with skepticism or hostility from the US and European teams. Other proposals ranged broadly across issues of international standards, elimination of export controls, local-content requirements, trade, tariffs, the US trade deficit, dumping, access to foreign government-supported research and development, information security, and patent rights. Overall, the European Team was very positive on the summit, and the Japanese were very negative. The US was in the middle.

The teams could alter their futures by Toolkit investments and international agreements. However, as in real life, the teams' greatest influence derived from direct investments (internally and externally) and negotiating deals and contracts with other teams. These deals in fact comprise the primary "moves" in this Prosperity Game, comparable to the moves of individual pieces in chess. The challenges may represent specific strategies (such as the capture of the opponent's rook or bishop), or the accomplishment of the major corporate or government objectives (checkmate).

Because the large corporate and government teams initially withheld much of their money, and because the finance team was generous, the evolution of play was capital-rich. Previous games have stressed the importance of capital. This game let us explore what the world would be like with readily available low-cost capital. Another player-created feature was the surprisingly pro-business attitude adopted by all three government teams. The effect on the players was striking. At the start of the game, players were optimistic about the interdependencies of companies, voting a 4.0 (on a scale of 1=*very little* to 5=*very much*); they were somewhat less optimistic about the benefits of industry-government interdependency with an average score of 3.56. After only one day of play, these attitudes were reversed: 4.0 for industry-government interdependence, and 3.56 for company-company. This change was probably due to unsatisfactory negotiations between some companies, and more satisfactory negotiations between

companies and their governments. Views on region-region interdependency were essentially unchanged, even though the fraction of inter-regional agreements increased with time.

The human dynamics within the teams varied greatly. Some teams took time for assessment and the formulation of a cohesive strategy; they then attempted to execute that strategy throughout the game. Other teams defined their goal as simply to win. They favored speed (get there first) and the seizing of opportunities. This latter approach tended to create internal dissension and the lack of buy-in by all team members.

Three types or classes of strategies emerged during the play.

- *Carpe diem!* — Seize the day.

Identify targets of opportunity or easy-to-reach agreements and consummate them quickly; separate; disjunctive; or-or.

- *Partes Pro Toto!* — Parts for the whole.

Several different agreements are negotiated, none of which is individually sufficient, but taken together they can succeed; connected; conjunctive; and-and.

- *Crescit eundo!* — It grows as it goes.

Negotiate a series of contracts and alliances to meet the needs of the initial situation and synthesize new opportunities, proactively carrying the action forward in time; serial processing.

In this report, we have developed these observations of strategy development and execution into a scoring system that assigns increasing robustness and penetration to strategies of higher level. These levels have a one-to-one correspondence to previous work on management hierarchies, information processing and complexity, and modern n-value logic theory (truth tables). Although not observed in this game, the highest level of strategic thinking might be called:

- *Impetus Futuro!* — Force for the Future.

Identify the growing trends that will dominate business and social opportunities when they mature and create a new element that will simultaneously and synergistically grow with the trends, creating an improved future state; parallel processing; synergism.

The game also allowed us to compare the players' interpretations of cultural differences versus those reported in the literature. Reasonable correlations were found. The Japanese tended to play conservatively, while the Americans were very entrepreneurial. In contrast, the pro-business behavior of the US Government Team seemed closer to the perceptions of the relationship between the Japanese government and its businesses.

Situations in the game frequently paralleled reality. As in real life, individual players could energize or disenfranchise other team members. Exchange of intellectual property and money often built robustness and created win-win agreements. However, a default often had long-lasting negative consequences. Interestingly, regionalism diminished as the game progressed.

The players' evaluation scores were among the highest achieved to date. Although many suggestions were made to further improve and refine the Prosperity Game concept, the players were overwhelmingly positive. One player wrote afterwards: "This very day, I am dealing with the situation — in real life — like the one we explored in Prosperity Games." Another said "The Prosperity Games vividly illustrated the principle that industry-government cooperative partnerships produce positive results - growth, revenue, jobs, new opportunities." And finally, "The two prototype Prosperity Games and the NEMI Game have demonstrated [a] unique tool for exploring real-life simulation of the dynamics of technology innovation and its commercial exploitation in global markets."

INTRODUCTION

A Prosperity Game is a new type of forum for exploring complex issues in a variety of areas including economics, politics, sociology, environment, education, research, etc. The issues can be examined from a variety of perspectives ranging from a global, macroeconomic and geopolitical viewpoint down to the details of customer/supplier/market interactions in specific industries. The concept originated in meetings with the staff of New Mexico Senator Jeff Bingaman, with Lee Buchanan of the Advanced Research Projects Agency, and with other government and industry people.

Prosperity Games explore complex issues

Game Objectives

This is the sixth Prosperity Game that has been conducted. The objectives of all these games have been to:

- Stimulate thinking;
- Develop relationships and partnerships among industry, government, labs and universities;
- Explore long-term strategies and policies;
- Lay the foundation for industrial roadmaps; and
- Provide informed input for possible future legislation.

This game was held in conjunction with the roadmap-making effort of the National Electronics Manufacturing Initiative (NEMI) of the Electronics Subcommittee of the Civilian Industrial Technology Committee under the aegis of the National Science and Technology Council. It's three main objectives were:

- Connect the technical and non-technical (i.e., policy) issues that have been developed in the NEMI roadmap-making endeavor;
- Provide energy, enthusiasm and people to help the roadmap succeed;
- Provide insight into high-leverage public and private investments.

Game Theory

In mathematics, game theory is the study of strategic aspects of situations of conflict and cooperation. "Game Theory approaches conflicts by asking a question as old as games themselves: How do people make 'optimal' choices when these are contingent on what other people do?"[1] Game theory originated with the mathematician John von Neumann as early as 1928. The collaboration of von Neumann on theory and Oskar Morgenstern on applications to economic questions led to the seminal book *The Theory of Games and Economic Behavior* that first appeared in 1944, and was later revised in 1947 and 1953. Game theory is an approach to developing the best strategies in areas such as economics and war to beat a competitor or enemy. [Of course, one possible strategy is to convert an enemy into an ally, or a competitor into a partner!]

A game is defined by a set of rules that specify the players, their desired goals, allowed interactions, and a method of assessing outcomes. There can be one or more goals with different levels of importance. The players adopt strategies, and the interactions of the "moves" based on those strategies lead to outcomes which may or may not be consistent with the players' goals. Complex games should involve look-ahead strategies that address the different possible moves that an opponent could make.

Games should involve look-ahead strategies

[1]From Steven J. Brams, "Theory of Moves," *American Scientist,* **81**, 562-570, November-December 1993.

It is important to try to understand an opponent's goals in order to maximize the probability of a favorable outcome. Games can be sequential, with player interaction allowed between moves.

PROSPERITY GAME DESCRIPTION

Game Scenario - SAMSON

The game scenario focused on an imaginary electronics product called SAMSON, a high-tech personal communicator/entertainment/ computer device. Although a current version of SAMSON exists, the final lightweight, portable advanced product will require hundreds of millions of dollars to commercialize. The current product is being developed and manufactured or imported by three companies, one US, one European, and one Japanese. The SAMSON product also has military applications and is viewed by the US Administration as being strategically important. The product is in the middle stage of development, but several key technologies need major innovation for the advanced technology to be successfully commercialized.

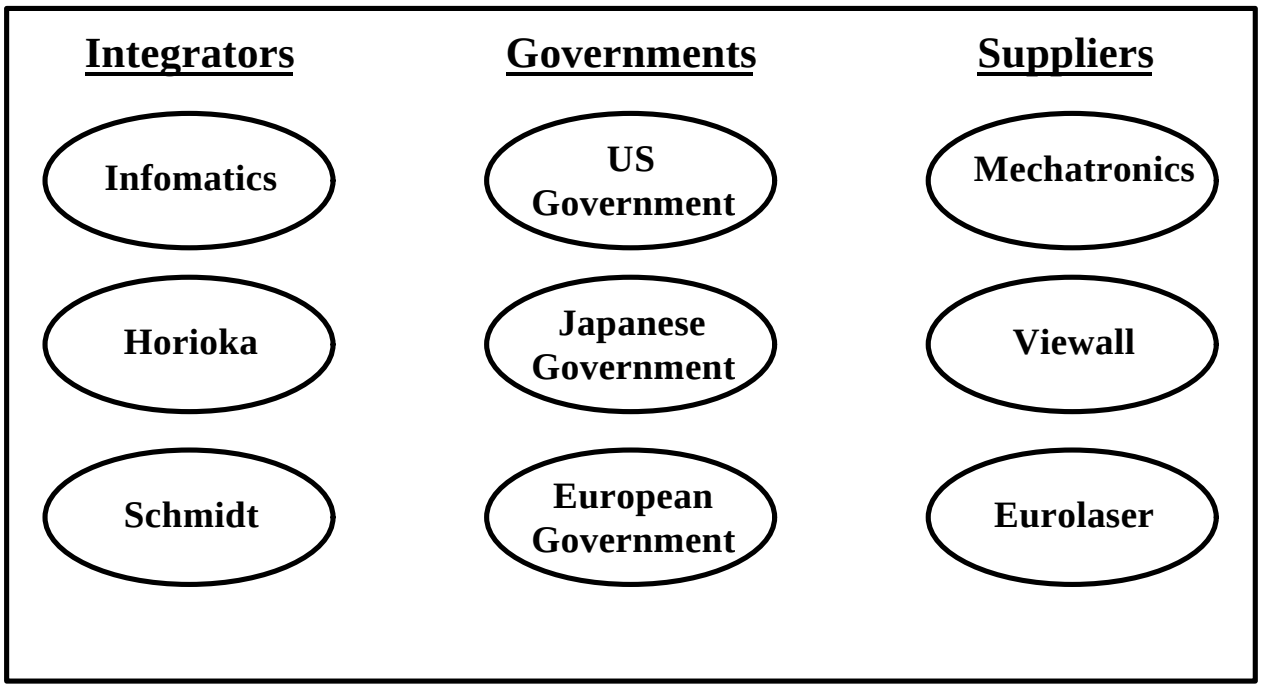
SAMSON is a spin-off of a military global battlefield communication device. The military product is currently very expensive and has limited capability. The ultimate consumer product is envisioned to have full color 3-D displays, bio-sensor interfaces, voice and pattern recognition, global communications, global positioning/location, video and audio links, remote banking, etc. The current product is limited by weight and power consumption, has a B&W 3-D display, and no bio-interfaces. Additionally, a large investment in artificial intelligence (AI) software will be required (approximately $100M is estimated). The key technical challenges are in software, human interfaces (tactile feedback, displays/sensory inputs), color displays, and low-power peripherals and mass storage devices.

The US Administration is about to submit its budget request for the next fiscal year and is willing to consider financial support to SAMSON-type projects, but is uncertain what the best financial levers are; it has requested corporate input and a 5-year technology development/commercialization plan. The US Administration must work within severe budget constraints as well as new treaties such as GATT (General Agreement on Tariffs and Trade) and NAFTA (North American Free Trade Agreement). Additionally a US - Japan - EC economic/trade summit is imminent. The other governments require similar information and have similar constraints.

Team Descriptions

The nine primary teams, Figure 1, are composed of executive management committees of each company and the cabinets of each government. Intra-company issues have been delegated to your subordinates so your work guides the company or government as a whole. The actions of each team are subject to the discipline of a working consensus; i.e., every member of the team can live with the corporate consensus position and no member of the team can do anything that is unacceptable to any other member of the team. Therefore, it is not necessary to choose manager-subordinate roles within teams.

Figure 1. Teams worked an independent reality



Infomatics, Inc. **US end-product manufacturer of electronics and computers for the information age**

Infomatics is a leader in sales of high-tech personal computers, entertainment and communication devices. It is pioneering, in the US, a new class of devices utilizing virtual reality concepts, global positioning and world connectivity (generically called SAMSON). Infomatics had $3B in sales last year with profits of $200M and invests $300M annually in R&D. It has a US Government contract totaling $3M, annually, to develop advanced displays and other bio-interfaces and has opened discussions with Eurolaser about supplying Infomatics with some critical components.

Infomatics assembles 30% of its products on-shore. Four years ago it was forced to heavily automate assembly and has invested $75M in robotics for assembly. This equipment is in need of a major up-grade. Some of the best automation equipment for assembly is manufactured by its direct competitor, (Horioka, Ltd., a Japanese company with 40% market share of early SAMSON devices, in comparison to your 45% market share). A key component, namely 3-D displays, are manufactured exclusively by Viewall, Inc., another Japanese Company. Infomatics owns key patents and intellectual property in software and architecture. These key patents have been licensed to Horioka to obtain these high-tech robotics. These license agreements with the Japanese competitor, Horioka, are due to expire in 18 months.

The Infomatics research department has been working on advanced 3-D displays with an annual budget of $15M. Infomatics has some good technology, but cannot keep up with the $100M R&D in displays being spent by its competitors. Infomatics has submitted several white papers for government funding of its display technology and may shut down the operation if no federal funding is obtained.

Horioka, Ltd. **Japanese end-product manufacturer for electronics, computers, and electronics manufacturing equipment**

Horioka Ltd. is a major supplier of these high-tech, SAMSON entertainment/communication devices with 40% market share. Its factories are highly automated, utilizing equipment developed internally. Horioka is a large diversified $10B company. Last year, sales of SAMSON products totaled $40M and company executives expect new SAMSON sales to exceed $500M within 3 years of their introduction. Horioka invests $400M annually in electronics R&D. It has license agreements with Infomatics for elements of SAMSON which cover only the first generation, and is developing new technologies to circumvent the patent issues. However, the Infomatics-proprietary operating system leaves Horioka with little choice but to negotiate a new license agreement, or try to introduce a new operating system which may not have wide acceptance.

Horioka has obtained the patent rights in the past, due to its strong position in automated assembly. Horioka's high levels of automation allow it to manufacture products at a lower cost with higher profit margin than Infomatics. This automated assembly equipment is manufactured and sold worldwide by Horioka's Advanced Automation Division, which supplies automation equipment for the semiconductor and electronics industries with annual sales of about $700M.

Horioka is also a manufacturer of CPU's and DRAM's. Horioka and Schmidt have jointly developed an ultra-low power CPU for SAMSON, which could give Horioka a significant sales advantage.

Horioka purchases 3-D displays from the same Japanese company as Infomatics.

Schmidt, GmbH. **European supplier and end-product manufacturer of electronics**

Schmidt is a European supplier/manufacturer of consumer products such as computers, stereo equipment, and automotive and medical electronics. It has jointly developed, with Horioka, an ultra-low-power CPU which could create a significant sales advantage when used in a SAMSON-like device. Schmidt is seeking a cooperative agreement with either Infomatics or Horioka on the development and manufacture of the SAMSON product. Schmidt has sales of about $3B annually; however, its PC factory in Hamburg is operating in the red and there is pressure to show a profit or close it down. Schmidt's leadership in consumer electronics sales in Europe has it strategically positioned to introduce SAMSON in Europe.

Schmidt has a $1.5M ESPRIT contract (cost shared) to develop advanced bio-sensors which could add additional capability to the SAMSON device for medical applications, sports applications, and for the disabled.

Mechatronics, Inc. **US manufacturer of automated manufacturing equipment**

Mechatronics' business is automated assembly of printed circuit boards, and automated wafer handling. It also supplies some robotics to the automotive industry. Additionally, it has developed some automated advanced packaging equipment, but has seen few sales. Mechatronics has total annual sales of $75M, but its sales position has been slipping dramatically. Mechatronics' management hopes these new advanced packaging and robotic assembly tools will help Mechatronics regain some lost business. However, even though SEMATECH has declared that

Mechatronics' advanced packaging tools are the best in the field, they are still viewed as inferior to those available off-shore. Mechatronics has a $1M R&D program with SEMATECH to develop advanced robotics, and a $400K ARPA contract on CAD/CAM simulation and software development. Although Mechatronics has several R&D efforts which could have significant impact on its business, it lacks the capital needed to implement them.

Mechatronics has proposed establishing a manufacturing/user consortium for the development and manufacture of advanced robotics. Additionally, it has approached Infomatics about a joint development program.

Viewall, Inc. Japanese display manufacturer

Viewall, Inc., manufactures 95% of the world's 3-D displays for which Viewall and MITI have invested $250M in their R&D. Viewall is currently selling without prejudice to all US, European and Japanese companies. Its annual sales of all displays is $1B. Sales of 3-D displays at present is only $12M annually, but is expected to grow to $300M in 3 years. Viewall spends $100M annually in R&D and is developing bio-interfaces and sensors that could revolutionize the industry. This new technology is 3-5 years away. Viewall displays are performance limited by the electro-optic laser arrays manufactured in a subsidiary plant. Viewall is interested in acquiring electro-optic array technology from Eurolaser, but has no deal pending.

Eurolaser, GmbH. European electro-optics manufacturer

Eurolaser, Inc., manufactures electro-optic devices. One of the technical challenges to high performance 3-D displays is a high-quality electro-optic laser array. Eurolaser has emerging technology which could revolutionize the 3-D display field, but does not have the financial ability to commercialize. Viewall has been trying to purchase the technology and/or the company, but has been unable to do so to date, mainly because of political reasons. Eurolaser's display R&D is financed on a $2M ESPRIT contract and $1M from the government. Several European countries and the US have opened a dialog about cooperative efforts in microelectronics.

Rootska, Ltd. Ukrainian Software Company

Rootska is a company of 25 software engineers/computer scientists with a total staff of 45. Most of its products are in games and entertainment. Its claim to fame is an interactive, mentally challenging game for PC's and Nintendo-like systems called Quadratures. Rootska received $1M last year from Horioka in royalties for this game. However, the game is getting old and royalties will be significantly less this year. Most of Rootska's effort over the last 18 months has been in operating system development. A 16-man effort has been devoted to this AI software development. Rootska has technology that could revolutionize the SAMSON product by giving the operating system a "human" appearance while still maintaining full compatibility with OSPC. It has tried to interest Infomatics and Horioka, but with little success. Several times Rootska tried to demonstrate the software, but it was severely limited by the hardware testing platform and critical software bugs. The company desperately needs financial support. It has many talented people who are severely underpaid. Many are seeking jobs in the US and Japan.

US Government Team

The US Government team has composite federal and state authorities and promotes political, social, military and economic agendas in the interests of the US citizenry.

Japanese Government Team

The Japanese Government team is to promote Japanese political, social, military and economic agendas.

European Government Team

The European Government team is to promote European political, social, military and economic agendas.

Green Team

The Green Team is the game control. They represent the rest of the world. The team represents finances, investments, consumers, raw materials suppliers, voters, the media, labor, and other governments and industries as needed. The Green Finance team operates independently and negotiates deals with the companies and governments. The Green Team will:

1) Participate in team negotiations as requested;
2) Provide information and responses as needed;
3) Determine probabilistic outcomes of investments and negotiations;
4) Keep the game interesting and moving.

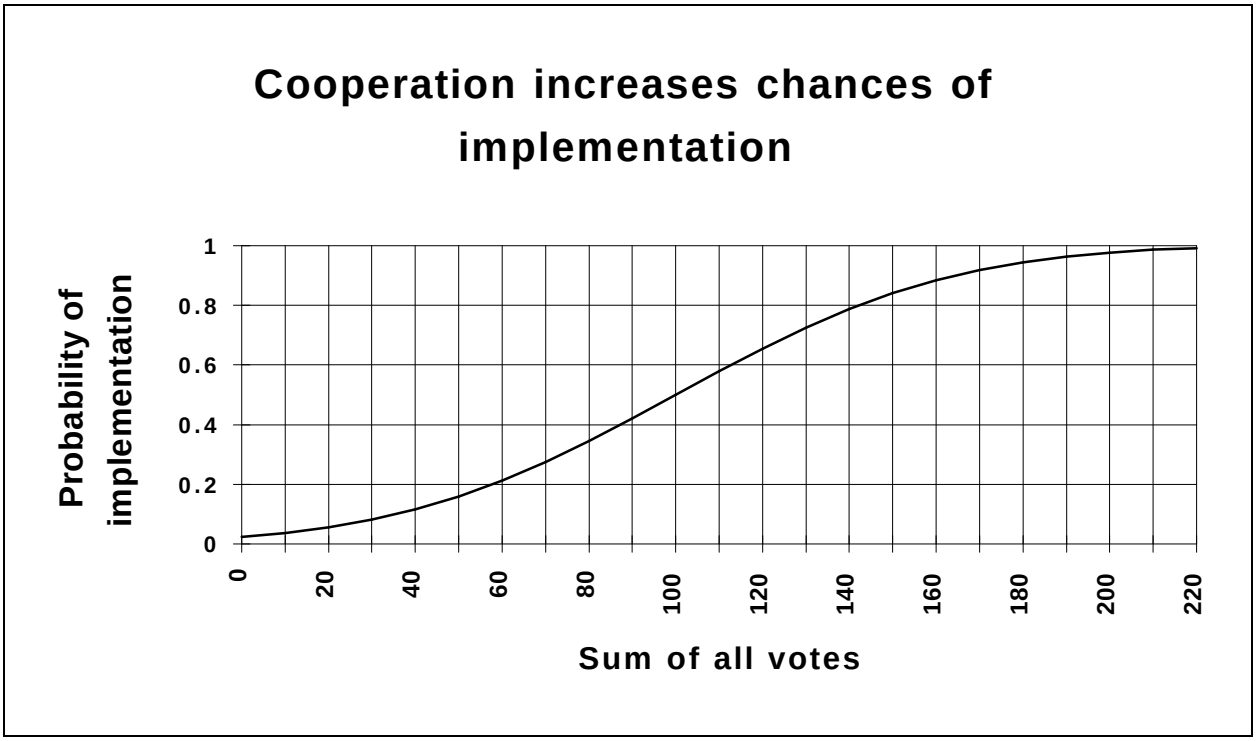
Technology and PolicyToolkit

The Electronics Subcommittee (ESC) is working on a roadmap for the electronics industry through the National Electronics Manufacturing Initiative (NEMI). The roadmap has both technology and non-technology (policy) elements. The Toolkit employed in this game reflects the options examined by the NEMI Roadmap Framework Committee. The Toolkit presents an opportunity to examine those options in the context of simulated but real-world industrial and government policies and actions.

Implementation of a toolkit option changes the constraints of the game. Each option costs money (dollars). The transaction is probabilistic in nature. The more credits you apply to an option, the more likely it will occur. Figure 2 shows a normal cumulative probability distribution with mean of $100M and standard deviation of $50M. As an example, an investment of $150M would yield a success probability of 0.84; an investment of $200M, twice the mean, would result in a probability of almost 0.98.

In the detailed descriptions of the teams, players were assigned total initial resources (dollars) that were proportional to their total current assets. Governments were arbitrarily assigned an initial balance of $500M. These funds could be invested in business deals, R&D investments with other companies or national labs, purchasing patents and rights, etc. However, for investments in Toolkit Options only, the initial capital of the three small companies and the three governments were increased by an *influence* factor (see Appendix C). This factor simulates the relatively larger influence that governments and smaller companies can exert on policy changes than would be expected only from the assets assigned to those teams. Additional money can be raised by borrowing from the Green Finance Team. The full list of Toolkit options and the investments required for a 50% probability of success are given in Appendix C.

Figure 2. Toolkit options let the teams influence the game in accord with their strategies



RESULTS AND OBSERVATIONS

Summary

Analysis of Results

Prosperity Games are games of discretion and judgment and, therefore, need to be analyzed in the context of human interaction. Analysts observed each team's actions and recorded their understanding of the underlying

Prosperity Games are games of discretion and judgment

dynamics. They were chosen for their experience in interdependent group situations and for their ability for objective analysis; they were not trained psychologists --common sense would be quite sufficient. The players knew that analysts were there to understand the underlying motivations and actions that led to the play within the game.

Previous games had illustrated that people more effectively played roles that were close to their chosen and valued roles in life. Therefore, the government teams were populated by people from government and the industry teams were generally populated with people from industry. To enhance the fidelity of the play, each of the non US teams from industry had one executive from the appropriate region. Although we attempted to have Japanese and European government officials play on the Japanese and European government teams, we were unsuccessful in recruiting them. We hope to correct that deficiency in future Prosperity Games.

The players valued and created a capital-rich alternative reality with a pro-business government.

The game created an alternative reality where there was too much money. The prototype for this game had used noncurrency credits for investing in the Toolkit options. Those players objected and suggested we use money for Toolkit options and for the conduct of commerce throughout the game. In anticipation that more money would be invested in Toolkit options, many teams were given a great deal of money. Generally they did not spend as much in Toolkit options as expected, with a few exceptions; therefore, there was a lot of capital left to play the rest of the game. Since the availability of low-cost capital was often a very high priority in previous prototypes of Prosperity Games, this alternative reality with low-cost capital was useful to explore. The game designers see this as an advantage, not a deficiency. The fact that the players constrained their investments in the Toolkit options, so there would be plenty of low-cost capital to play in the negotiations, indicates the overwhelming importance of low-cost capital to these players.

This alternative reality with low-cost capital was useful to explore

The games did not require government to be pro-business, but the players chose generally to be so inclined and the dynamics between industry and government reflect this alternative reality. The executives who accepted the invitation to play Prosperity Games may have been predisposed to a cooperative relationship between industry and government. However, the initial declaration of expectations indicated most had higher expectations for company-company interactions (79% positive or very positive) than for company-government (52% positive or very positive). The pro-business government behavior may indicate an emerging expectation in our society for such cooperation. Since Prosperity Games explore new possibilities, the game designers see this particular departure from reality as an advantage rather than a deficiency.

Pro-business government behavior may indicate an emerging expectation in our society for such cooperation

Formulating a cohesive and thoughtful strategy was very important.

The human dynamics within the teams varied greatly. Some of the teams, particularly Infomatics and Mechatronics, took the time to assess the situation and formulate a cohesive strategy to pursue. The analyst reported that the more deliberate strategies apparently paid well.

> *"The Infomatics team developed their strategy by going through a SWOT (strength, weakness, opportunity, threat) analysis. They spent a great deal of time with this analysis and subsequent discussions after which the team strategy evolved quickly and naturally. During this time, they turned away representatives from many other teams, explaining that they would like to meet later after the team strategy was solidified.*
>
> *Infomatics defined their strategy early and then made all of their decisions based on that strategy. Never did the strategy change or shift. It endured through the entire game, which indicates that it was soundly based. The Infomatics view was that the early agreements that they made covered all of the nit-picky stuff that other teams were coming up with later. Many times a team would approach with some little detail, and Infomatics would respond "Yes, but its already covered." The Infomatics team approached their agreements globally and in good faith, and*

did not worry about some of the little things that could bog them down. As a result, they had solid agreements on everything they thought they needed. This included a high degree of global partnering. The other teams came to perceive their strength, and toward the end of the game, everyone was knocking at Infomatics' door."

Other teams, notably the European Government, Horioka and Schmidt, did not develop a robust strategy early in the game. The European Government chose to proceed as quickly as possible to the negotiations on a presumed strategy or were distracted from the strategy formulation process by pressures to complete deals. They then distracted Schmidt from thinking through their strategy completely. Horioka did not report a strategy and seemed consumed with internal discussion.

Without the cohesive force of an agreed-upon strategy, negotiations became ad hoc and team members lacked buy-in. As reported by the analyst forthe European Government Team:

"The European Government team's process was frequently typified by the following:

1. "Lone Rangering" by individuals
2. Hip-shooting in decision making
3. Crisis management style
4. Confusion because there was not a common strategy/value base for independent empowered actions. (The open-loop nature of the game seemed to exacerbate this situation since there was little real-time feedback on the group's action.)"

In general, the time spent in formulating a strategy created a backbone for the future negotiations and built the team dynamics that warded off frenzy and enabled success. As the National Electronics Manufacturing Initiative (NEMI) progresses through its planning phase, these lessons would be well worth remembering.

Perceived national roles and the experience of the players shaped the character of the teams: Large Japanese companies are risk averse and American companies are more entrepreneurial.

Fidelity between the play and reality was enhanced by having government and industrial personnel play their respective roles and having one Japanese/European executive on each of the Japanese/European industrial teams. In addition, the players carried into the game their perceptions of the various national entities. The sociology of multi-national business interests was studied by Geert Hofstede for IBM in the 1970s.[2] The following illustrations from his book, Figures 3 and 4, show the business culture of the Japanese, the appropriate subset of Europe, and the US in the behavior-controlling variables of individualism versus collectivism, degree of risk avoidance, and perceived power distance between positions within an accountability hierarchy. In addition, Hofstede surveyed what he called masculinity and femininity, but these terms had little correlation with the perceptions of the players in the game and was, therefore, not used

The degree to which industry and government leaders intuitively recognized these differences among national identities was tested in a previous Prosperity Game, Figures 5 ,6 and 7. The general perception of the players in these three behavioral areas were in good agreement with Hofstede's results.

[2]Geert Hofstede, **Cultures and Organizations, Software of the Mind,** McGraw-Hill Book Company, Europe, 1991

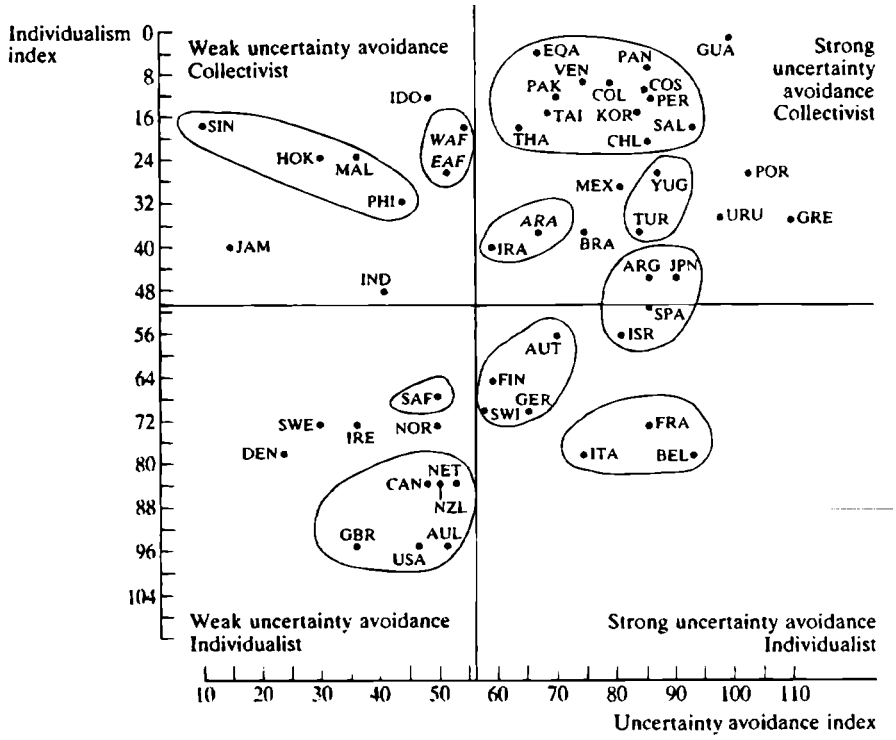


Figure 3. Individualism vs. uncertainty avoidance.

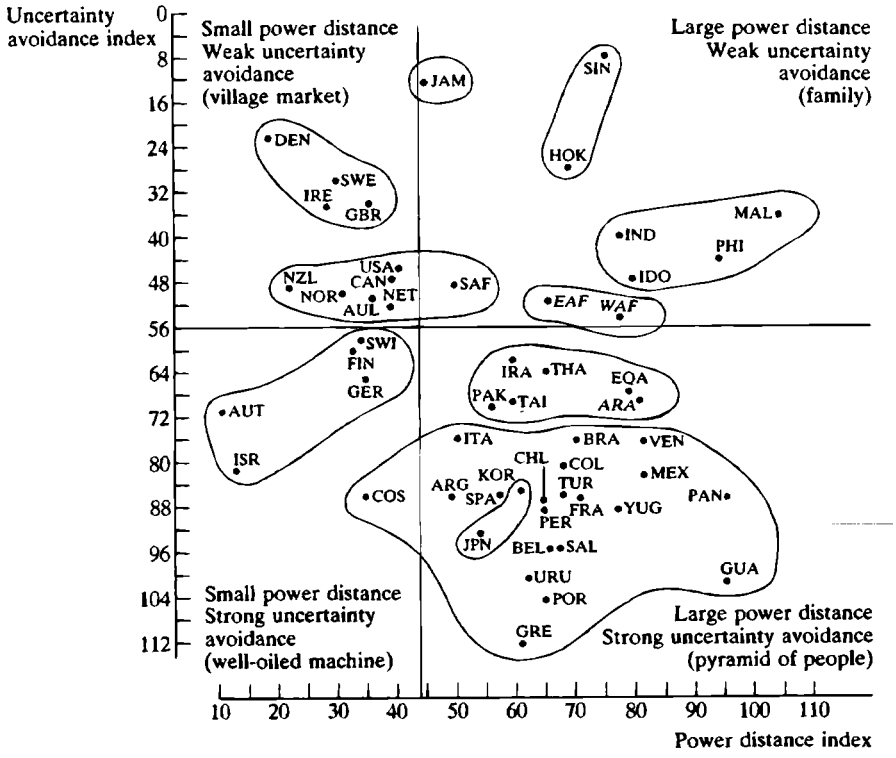


Figure 4. Uncertainty avoidance vs. power distance.

Figure 5. Individualism (1) Versus Collectivism (10)

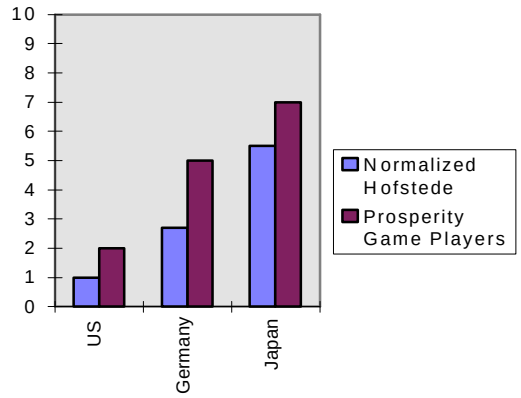
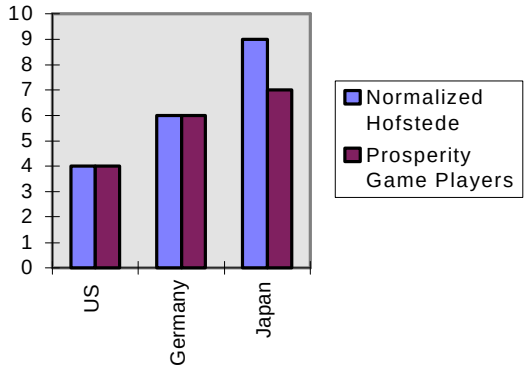


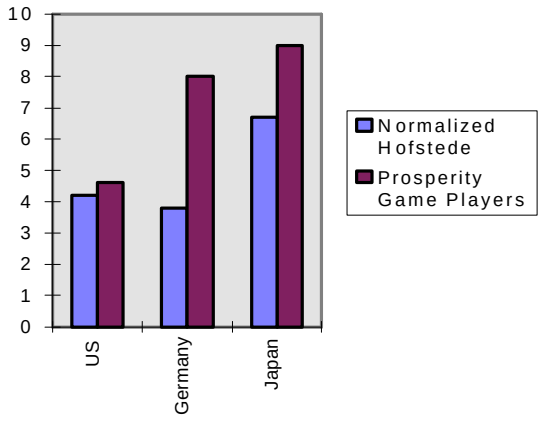
Figure 6. Uncertainty Avoidance: Weak (1), Strong (10)



The general character of the play reflected the perceived cultural factors described in Hofstede's work. For example, the Japanese Horioka team was very conservative. According to the analyst:

> *"Horioka had a BIG company mentality. Conservative attitude dominated; Horioka did not want to bet the company on one technology.*

Figure 7. Power Distance: Small (1), Strong (10)



> *Horioka resourced the program from inside first. More so by a real Japanese company.*
> *The team was analytic at first, then the competitive juices dominated.*
> *We wanted to organize from top down and take a wait and see attitude by intent and use our major resources once a path was known.*
> *Horioka had a well-to-do company attitude.*
> *As in real life, small companies were moving faster than large ones".*

Horioka had sufficient capital to completely dominate the games but chose not to do so. Part of this conservatism could come from the stereotype of an exceedingly large company and part from its Japanese role. The Japanese player on the team observed that a truly Japanese company would have been even more conservative.

In contrast the US industry teams of Mechatronics and Infomatics were very entrepreneurial. It is true that the smaller and more threatened Mechatronics was much more entrepreneurial and aggressive than the larger company, Infomatics. But Infomatics was much more venturesome than Horioka.

Hofstede identifies extreme individualism as the dominant characteristic of US business. However, the rugged individualism of the US team was softened in the Prosperity Game by the more cooperative attitude generally found among high-level executives, in which networking, the ability to formulate successful joint ventures, and the ability to survive changingtrends in society are highly valued[3].

The planning for NEMI may consider the cultural tendencies of the business communities in the United States, Europe, and Japan, as well as the strengths and weaknesses of large and small companies in formulating its implementation strategy.

A single energized player can distract his or her team and other teams, as in real life.

The analyst reported that much of the European Government Team's play could be attributed to a single individual whose proactivity was overwhelming--to the dissatisfaction of the rest of his team members. The SchmidtTeam's analyst observed:

> *In the dynamics of forming the European Consortium, it became obvious that the European Government team was driven by forming the Consortium and their constituents achieving some level of market dominance, i.e., power. The European Government team never seemed to give their constituents time to assess the bottom line for their particular companies, nor did they ask them how the European Government could help to establish conditions for a favorable bottom line. When a European Government team member said, "We need to act in a coherent and preemptive way," the Schmidt team member replied, "We need to do our homework." For the European Government team, market power/control, not profit for the companies, was the objective. Counterpoint: The European Government team was very supportive in making Toolkit investments to support the stated needs ofSchmidt.*
>
> *European Government exerted somewhat too much influence over Schmidt, due largely to a single individual on the European Government team. The influence of dominant individuals, however, would be encountered in real life. The compression of time, and the concomitant limited time to study/evaluate actions, exaggerated this phenomenon in comparison to real situations. Schmidt had only two players and a part-timer, and one of them had not had the opportunity to do adequate preparation. More players were needed"*

Inability to understand the situation and plan accordingly also happens in reality, although pressures of the game artificially enhanced this possibility. The fact that this distraction came from a government entity may be particularly important. An ill-conceived strategy by the government in their presumed position of authority can be much more distracting than the same influence from an institution without that assumed authority. In this sense, having a government that moves more slowly than industry may be a good thing.

We continue to seek insights from the games that might be helpful for the National Electronics Manufacturing Initiative. Planners should resist the temptation to be quick and instead should"do their homework."

[3]Elliott Jacques, **Requisite Organization, The CEO's Guide to Creative Structure and Leadership,** Carson Hall and Co., Arlington, VA, 1989, pp. 29-31.

Disappointment and lack of respect turned regional companies into global companies.

In the declaration of expectations at the start of the games, regional partnerships were more strongly preferred than transregional. Only 4% of the players strongly or very strongly expected transregional interactions to be mutually beneficial in a significant way. At first, the expectations were fulfilled. The European Schmidt team and the Japanese Viewall team spent most of their early encounters with their regional partners. However, when Schmidt sought to invest in an independent capability to produce flat panel displays, Eurolaser saw the larger company as a threat to its sovereignty and persuaded the European Government to refrain from supporting Schmidt's investment. In reaction to that, Schmidt shifted from a strongly regional focus to a truly global one. The analyst for theSchmidt team reported:

> *"Their strategy was built primarily around protecting that position. However, as the game progressed their view of themselves changed; they began to see themselves from a more global perspective. As they did so, their strategy was modified (although not formally) as they became players on the global scale. They even projected themselves outside the defined game, i.e., beyond electronic systems development and marketing to identifying their need to impact the world automotive market. My point here is that, in my view, during the course of the game and as a result of the events of the game, the team moved toward a much more global view of themselves as a company than they initially defined."*

Similarly, Viewall was angered by the Japanese government's default on a Toolkit agreement. Viewall, whose portfolio was always global, became much more active in transregional negotiations.

In life there may be a parallel. Smaller companies that are regionally focused may have difficulty getting the attention of larger companies or of the government and turn instead to the international arena, in spite of a declared preference for regional business. NEMI should consider the global opportunities and tendencies of small and medium sized companies, as well as the giants.

A small flexible company can salvage an apparently hopeless situation through managerial leadership.

Mechatronics was on the verge of going out of business. The Mechatronics management team had real-life experience with difficult business situations. They applied their knowledge and talent to what should become a textbook case for saving a company. The strategy and the implementation of Mechatronics would be a useful case study for any business school in the country:

> *Get a commitment from US Government to fund Mechatronics if Mechatronics can find a big customer for their product.*
> *Determine interest and benefit to industry.*
> *Continue SEMATECH funding and establish Mechatronics as "best of breed."*
> *With partners determine Toolkit options for investment.*
> *Raise $200M.*
> *Create technology roadmap to benefit our partners/allies.*
> *Become leading edge, global, robotics supplier.*
> *Provide competitive/cost advantage to users.*
> *Develop strategic alliances/partnerships with industry, government, universities, etc.*

Diversify into related new markets, building on core competencies.
Leverage business base, e.g. automotive robotics business.

In addition to a solid strategy and implementation, their success stemmed from self-directed specialization as the game progressed. Each of the members of the team functioned in his or her strongest role to make the team greater than merely the collection of the individual talents. Each of the team members was empowered informally, within the guidelines agreed upon by the team, to negotiate on behalf of the company. The analyst reported a winning approach:

Make the team greater than merely the collection of the individual talents

"The success of play by the Mechatronics team can be largely attributed to the close match between the roles defined for the team and the actual positions these players hold in the "real" world. Mechatronics Inc. was virtually bankrupt. The players immediately focused on the financial needs of the company in order to maintain its solvency, rather than being dazzled by its technological capabilities. The Mechatronics Team initial structure followed the game suggestion of acting as a management board in which each player had a common role. As play progressed, the players developed increased degrees of specialization in their roles. This specialization reflected the particular talents and interests of the players and did not involve ego conflict or power grabs. Smooth play was further facilitated by agreement among the players as to negotiating tactics. Guidelines were agreed upon by the team for each negotiation, so that a single player could deal with another team without having to constantly return to the home team."

This informal arrangement worked superbly in this Prosperity Game and could be applied to almost any enterprise.

Financial backing is a major incentive for success.

A key factor of the Mechatronics' success was the psychological as well as fiscal boost obtained from financial backing. When the bank agreed to lend them $100 million, it gave them the confidence to successfully negotiate for new business and fulfill a long-term strategy for the company. Papken Der Torossian, Chief Executive Officer of Silicon Valley Group, and a Mechatronics team member said,

"The Games showed that technological leadership is not enough to assure success -- we have to have capital and customers. The lesson for all of us is that timing is very important, technology is perishable. If we do not move quickly, with the technology, with proper private or public financing, and with customers committed to buy, the enterprise fails. Availability of timely capital was essential for success in the Games and in life. Even though we used only $50 million of the $100 million line of credit we negotiated with the bank, the $100 million gave us the courage to focus, to bet the company with the plan and vigor for success. Halfway commitments would have failed, like they would in life."

Halfway commitments would have failed, like they would in life

Exchange of intellectual property and money built robustness.

Mechatronics developed an excellent customer-oriented strategy: obtain commit-

ment by negotiating almost every deal with an exchange of intellectual property or relationship building objectives, as well as money. For example,

> *Mechatronics grants to Infomatics exclusive rights to purchase Robo-APS equipment and all upgrades thereto as applied to all SAMSON class products; Infomatics will pay the greater of $10M per year or 25% of SAMSON Division EBIT for years 8 through 20.*
>
> *US Bank agrees to loan Mechatronics $100M at LIBOR interest rate. First 2 years interest only due, paid quarterly. Loan has a renewal option in 5 years. Additional $100M is committed with an equity option, if the Glass-Steagall Act is repealed.*

The relationship features in the agreements helped deter a partner from defaulting and assured that the deal was robust.

Prosperity Games revealed the psychological dimensions of deal making. Confidence is important. As Mechatronics grew in its own confidence and in the minds of the surrounding players they moved more confidently from straight business relationships into a policy mover and shaker.

NEMI is primarily a joint venture. The deals that will hold the venture together for sustained action can be made robust by exchange of relationship building intangibles.

Supplier companies lead a very vulnerable life.

Both Viewall and Eurolaser were relatively small supplier companies. Both of them felt a strong sense of ownership and desired to grow under their own identity. When Schmidt tried to buy out the company, Eurolaser marshaled its resources, obtained counsel, from outside the game by a lawyer skilled in the practice of European company law, and successfully fended off the attack. However, Eurolaser's willingness to partner with Schmidt was shaken and it took time to overcome the distress engendered by this play.

Planning for NEMI can accommodate the strong sense of ownership and self-determination in small and medium sized businesses. The supplier companies to Original Equipment Manufacturers (OEMs) must be explicitly included as essential and empowered participants.

The impact of defaulting grows with time.

Viewall tried to enter a partnership through the Toolkit options with the Japanese government, Horioka, and Schmidt, and was greatly disadvantaged when the Japanese government defaulted on the agreement. Viewall lost substantial market share. The mistrust that was engendered by this decision was substantial. The voting after the Summit on the degree to which industry and government were succeeding in partnering was demonstrably different in the Japanese communityversus the US community.

The mistrust seemed to grow during the game as Viewall continued to reference the Japanese defaulting. The insight from these experiences that needs to be tested in reality is that mistrust generally grows rather than fades with time after one party defaults from an agreement. As the National Electronics Manufacturing Initiative develops, a great deal of communication will be required to avoid defaulting on the psychological contract for mutual benefit to all participants. The Executive Secretariats must be very conscientious to avoid defaults and the

appearance of defaults or raids disadvantaging a participant.

There was a strong correlation between the thoroughness of planning and the cohesiveness within a team.

Viewall and European Government got into the play without much of a plan. The analysts reported that both of these teams tended to be disjunctive (i.e., negotiated deals were not strategically connected beyond just meeting disjointed objectives) in their overall strategies. Substantial confusion compromised their effectiveness in the play. The Viewall self-evaluation and the analyst for the European Government were quite explicit:

> *"Play seemed to start around the Viewall team. As a result, any hope of the team taking more than a superficial look at the company's business, financial, technical status was lost. Only a cursory evaluation was made of their competition or their customers. They rarely re-evaluated their situation and did not follow up on deal making. For example, there was no reliable connection made with the Japanese Government (this resulted in the Japanese Government reneging on a deal and not informing Viewall). There was no time for strategic planning, they just started to play. The strategic plan was developed as play was occurring around them and often the plan took on the nature of the particular deal that was being made at the time. This led to the unrealistic situation where the team was trying every possible scenario with no apparent implementation plan."*

> *"The European Government team started out its actions with a discussion of its overall goals. However, the pressures of time created by taking too long on generalities did not allow the group to develop definitive strategies to broadly respond to these goals. Instead, the team focused on game-winning tactics that were typically reactive to events at hand. Few agreements were reduced to writing in the early portion of the game. The European Government frequently fell into a "techie" decision-making role rather than focusing on policy. Perhaps this was the result of the fact that the team never clearly established what the role of government was supposed to be in the game."*

> *"An underlying issue with the group was the fact that some members of the European Government team felt cut-off and that a government perspective was not being accurately reflected in decision-making and there was no real discussion for issues of substance. Two of the direct government members of the team seemed uneasy or withdrawn from the process."*

On the other hand, Infomatics and Eurolaser took their time to develop a plan, and in the process formed a thoroughly cohesive team. Mechatronics was a special case in that the group quickly became cohesive and made a very effective plan. There seems to be a strong correlation between planning and team cohesiveness which allowed these teams to survive and manage adversity and grow beyond their initial role in the game.

The insights gained from these observations support the often espoused notion that there is no substitute for planning. In addition, the play suggests that the team's cohesiveness is at least as important as the substance of the plan in the conduct of business in an adversarial situation.

Industry-led, government-partnered activity had mixed success.

The US government team actively pursued industry-led, government-partnered activities. The government team was generally pro-business, without the team entirely giving up their obligations to the citizenry. In a rare show of restraint, the US Government team imposed a limit on the percentage of a bank's assets that can be invested in the equity of companies after the repeal of the Glass-Steagall Act. In the final briefing, the US industry teams reported that the support from the US Government Team was very strong, felt good, but was unrealistic.

support from the US Government Team was very strong, felt good, but was unrealistic

The basic European government strategy was to win the game, which in this group's interpretation was for the European region to be dominant in SAMSON market share and technology. The actions were consistently Eurocentric with a bias against the Asian region. The Government team was more focused on achieving a self-reliant Europe than were its European industry partners. Although the team was very accommodative towards European industry, Schmidt team members felt pushed into a strategy that might not be in its best interests. The European Government strategy resulted in just giving $100's of millions of dollars in Government purchased Toolkit products to European industry in exchange for the simple promise of creating some jobs in Europe. The persistence of the European government team undermined the partnership between industry and government in the European teams.

The Japanese Government team--which had no Japanese citizens -- also generally failed to accommodate industry-led, government-partnered activities. The conversations within the Japanese Government team bordered on arrogance. Typical quotes collected during the discussions were as follows:

> *"We're the government, companies should come visit us [not the other way around]"*

> *"Horioka [Our Japanese companies] needs to learn some respect. They don't seem to understand that we can fund a new company through consortia, and tax them [Horioka] out of business in a month."*

The Japanese Government team was therefore wrapped up in its own agenda. The team missed many deadlines in the game in order to secure their own way. They generally ignored the NEMI-related Toolkit options and created their own options which were simplified versions of their strategy. In essence the Japanese Government tried to buy their strategies instead of negotiating them with their fellow players. In addition when the Japanese Government Team overspent and had to default on a deal with Viewall--which cost them substantial market share--distrust grew. The industry and government relationship in Japanese teams, played mostly by Americans, did not show the tight cooperation that Americans expect from Japanese.

Although all three government teams tried to further the economic advantage of their regions, the partnerships with industry were not as robust as could have been achieved by a truly strategic approach. Nevertheless, a comparison of the pregame voting on the expectations for industry-government partnerships and the voting after the first day showed movement in favor of industry-government partnerships. In the pregame vote, 52% expressed positive or very positive (4 or 5) expectations about industry-government collaboration while 77% voted a 4 or 5 on the

related question of constructive interdependency between industry and government. If the National Electronics Manufacturing Initiative is to achieve a robust cooperation between industry and government, the results of these Prosperity Games indicate the relationship will require a great deal of work.

Regionalism diminished with experience during the game.

In the initial declaration by the participants, individuals anticipated that they would prefer to make deals within their regions, company to company and finally company to government, as discussed in the section on Game Evaluations by Players. In the pregame voting, only 16% of the players voted positive or very positive (4 or 5 on a scale of 1 through 5) on the potential for region to region cooperation and interdependence. At the end of the first day, that percentage had dropped slightly to 11%.

The early play did indeed tend to be within regions. However, as the pace of the game increased and the players became more and more engaged with the activity, more deals were made across regional boundaries as shown in this comparison of the types of contracts that were negotiated on the first and second day, without the Rootska contracts, which were inherently inter-regional, Figure 8.

players became more and more engaged ... across regional boundaries

Playing the game reduced the initial bias against regionalism.

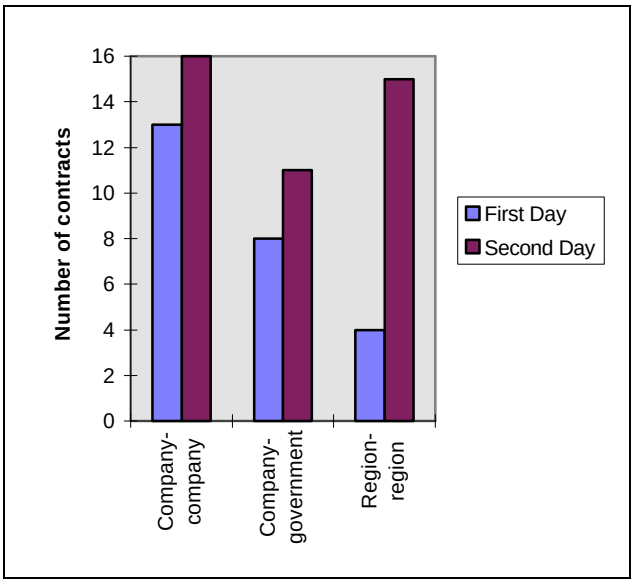


Figure 8. Contracts on First and Second Days

Anti-Japanese sentiment surfaced during the summit.

At one level this was just a game. At another level, players behaved because of what they thought and those thoughts were consistent with what they felt. The strong sentiments treated in the popular press[4] emerged in the Summit. The Japanese team made a proposal for international cooperation in technology development related to SAMSON. The American response presumed that this proposal was to capitalize on the technological strength of the US to steal its technology for Japanese advantage. The Europeans did not quite know what to make of the proposal for cooperation from the Japanese but mistrusted it and promised to "study it thoroughly and for a long time.". The Japanese call for cooperation was therefore rebuffed. Although the Japanese team countered with a milder resolution for the “decade to end illiteracy” through the benefits promised by the SAMSON device, which passed by a

[4] E.g., see Michael Crighton, **Rising Sun**, Ballantine Books, New York, 1992, and Tom Clancy, **Debt of Honor**, G. P. Putnam’s Sons, New York, 1994.

reasonable margin, the play quickly turned against the Japanese.

The European proposal was particularly targeted against the Japanese and was advocated with great enthusiasm even though there was no real definition of what each of the sub-proposals really meant. It passed overwhelmingly without the virtue of understanding the implications of this very broad, but very thin, proposal. The Japanese walked out.

Although a "walk in the woods" with the executives of the three governments narrowed the scope of the European proposal sufficiently to let the game play continue, the play dramatically demonstrated a deep-seated suspicion of Japanese commercial practices. Given the amount of literature — both fiction and nonfiction — aimed at exposing or negatively portraying Japanese businesses and decrying the trade imbalance with Japan, the strong reactions should not have been so surprising. However, the vigor of it in this game was thought-provoking.

National laboratories as part of government were nearly invisible.

National laboratories players were assigned to the government team and therefore played as part of government. In contrast university teams were free agents that were allowed to become entrepreneurial spirits. The university teams were understandably much more proactive and much more effective in stimulating new ideas among company teams than were the national laboratories players.

In life, national laboratories have missions in the public interest and are therefore funded and aligned with government, even though their personnel are not civil servants and do not have the authority to speak for government. That public mission is principally national security, which now includes economic security. More importantly, the public missions of the laboratories could be furthered by appropriate partnerships with industries essential for the effective conduct of those public missions, which is different for different laboratories. The relationship with industry that would optimally support the economic security and the more narrowly focused national security has not yet been defined. The results of the Prosperity Games imply that the national laboratories need to have their role carefully defined to develop a proper relationship with industry in the national interest. Since the largest publicly available physical and personnel resources for electronics and electromechanical manufacturing resides in a national laboratory, the National Electronics Manufacturing Initiative could benefit by a careful review of the role of the national laboratories for synergistic public and private sector benefit.

Some players requested a way to score their team's play to encourage assimilating lessons learned.

Many executives have played business simulations in which the company with the highest profits won. Business simulations usually focus on profits and losses of individual corporations or their business units. However, Prosperity Games are games of discretion and judgment at the executive level of industry and government. These executives are concerned with networking, mergers, acquisitions, and joint developments and with synergistically exploiting national and international trends to advance their organization's interests. Since there are no validated models for predicting the profits resulting from such high-level strategies in life, attempting to do so in the Prosperity Games might be trivial or manipulative.

Consequently, we looked at the sophistication of the strategies to explore how these games might be productively scored in the future.

Scoring of Strategies - Analysis and Synthesis

This Prosperity Game involved over 1000 people-hours of high level executives interacting with trained observers recording and interpreting the events. The games provided a rare opportunity to explore strategies.

We took an empirical approach. An analogy illustrates the approach: When building a new college, the wise planner will let the students walk where they will for the first year and then capture their traffic patterns as sidewalks for future students. Similarly, we let the players formulate and implement their strategies without any guidance from the game designers so we could capture the patterns of their strategic thinking and planning for future games. This section describes what we learned.

This analysis may provide a useful way to score future Prosperity Games and link the games to business strategies. However, we will not reveal the score for each team in the NEMI Games for three reasons:

- The insights on strategy arose from the Prosperity Game itself, so the players were not and could not have been informed that the play would be scored. Scoring it now would seem like changing the rules after the fact.
- The emerging scoring system has not been validated, in the sense that a high-scoring strategy would be more likely to produce the desired results in real life.
- The reliability of the scoring system has not been established. A highly reliable system would have multiple assessors giving the same score for the same strategy.

We will pursue validation and reliability demonstrations in preparation for future Prosperity Games.

At the start of these Prosperity Games, the players were told to develop strategies for addressing the issues in their Players' Handbook, and to implement them by negotiating deals with other teams. The players were also advised that the robustness of their strategy would be the implicit measure by which their colleagues and competitors would judge each team's results. Therefore, each team's strategies were examined in detail to see what general patterns emerged.

Definitions of Terms

Challenge: An issue or opportunity to be addressed. For example, assure a continually improving operating system for SAMSON products.

Strategy: An approach for intentionally addressing a challenge. For example, develop a standards-setting, next-generation operating system that is backwardly compatible with the current system, and market it sufficiently for setting the standard for SAMSON products.

Move: A negotiated agreement, toolkit option, or summit initiative; e.g., develop an alliance with a university to lay the computer-science foundation for an adaptive intelligent operating system.

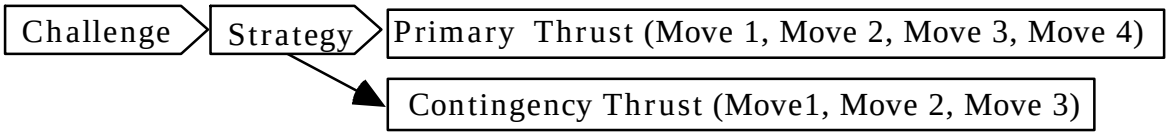
Thrust: A series of related moves logically joined together sequentially to

accomplish a strategy; e.g., (1) develop the scientific foundation for an adaptive, intelligent operating system; (2) concurrently partner with a university, the company, and a national laboratory to engineer a software testbed, and validate the system's reliability; (3) negotiate a cross-licensing agreement with competitors to promote the system as the de facto standard; (4) proceed with a professional standards-setting body to define the system as the standard; and (5) assure early market penetration by negotiating an exclusive field-of-use license for the new software withHorioka.

Penetration: Quality and quantity of moves that were accomplished within a thrust. Penetration was obtained by negotiating deals that logically built on prior agreements to advance the play.

Robustness: How well the implementation of the strategy protected the team from technology or market failure, or from defaulting by another team. Robustness resulted from contingency thrusts and from developing relationships supporting a move.

The following diagram illustrates the relationships among these terms:



The resulting taxonomy of strategies led to a scoring system that is a product of this Prosperity Game. The analysis and scoring proceeded in several steps and generated a diagram of challenges to be addressed, strategies, and thrusts (with the included moves), as illustrated in the following generic diagram; Table 1, the thrusts are implicitly represented by the series of moves and the challenge and strategy are simply repeated for each thrust:

Table 1. Generic Block Diagram of a Teams Play

Key challenges	Strategy	Move 1	Move 2	Move 3	Move 4	Move 5
Challenge 1	Strategy 1-1	XXXXX	XXXXX	XXXXX	XXXXX	
Challenge 1	Strategy 1-2	XXXXX	XXXXX	XXXXX	XXXXX	
Challenge 1	Strategy 1-3	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX
Challenge 1	Strategy 1-4	XXXXX				
Challenge 1	Strategy 1-4	XXXXX				
Challenge 2	Strategy 2-1					
Challenge 2	Strategy 2-2					
Challenge 2	Strategy 2-3	XXXXX	XXXXX	XXXXX	XXXXX	
Challenge 2	Strategy 2-4	XXXXX	XXXXX	XXXXX		
Challenge 2	Strategy 2-4	XXXXX				
Challenge 2	Strategy 2-5	XXXXX	XXXXX	XXXXX		
Challenge 2	Strategy 2-5	XXXXX	XXXXX			
Challenge 2	Strategy 2-5	XXXXX				
Challenge 3	Strategy 3-1	XXXXX	XXXXX			
Challenge 3	Strategy 3-1	XXXXX	XXXXX			
Challenge 3	Strategy 3-1	XXXXX	XXXXX			

The issues presented to each team in their Players' Handbook were matched to the strategies developed by that team in its planning period. Each move was aligned with the strategy, or strategies it supported. When a move built on a previous move and supported the same strategy, it was diagrammed as part of the same series. In effect, it extended the thrust. The larger the number of moves in a thrust, the more each deal built on the previous successes and the more penetrating was the strategic implementation.

Tentative scoring system

Isolated thrusts, perhaps in response to another team's initiative, received a score of +1 point. If the strategy was primarily composed of such unconnected moves, the strategy was disjunctive, as if the players were motivated to "Seize the day", or **Carpe Diem**, the first level of strategy. The following three moves from the European Government's strategy *"Our policy is to ensure European pre-eminence in selected SAMSON technology*" illustrate a disjunctive strategy:

- *National lab increases RF data rate by 5x.*
- *Industry-laboratory software family integrates design to delivery process.*
- *Intelligent software increases worker productivity 6%*

Each stands alone. They are not convincingly connected in the sense that having all three together does not make the case for European preeminence much more compellingly than any of the three alone. The three moves lack a reinforcing relationship that would make the case more compelling.

If the moves have reinforcing connectivity so that multiple moves reinforce each other and build a progressively stronger case, each of those move receives a score of +2 points. If the strategy is primarily composed of moves with reinforcing connectivity, the strategy implies that the players are motivated to build the "Parts for the Whole," or **Partes Pro**

Toto, the second level of strategy. For example, three other moves by the European Government for the same strategy (*Our policy is to ensure European pre-eminence in selected SAMSON technology.*) illustrate a conjunctive strategy:

- Robotic controllers for precision alignment.
- 0.2 micron precision assembly technology improves yield 30% and lowers cost.
- Packaging directly on display reduces costs and weight by 50%.

The three reinforce each other — in this case from a core competency point of view. If a banker listened to their case for a loan to build a new factory and these three capabilities were presented to build the case for potential European credibility, the case gets noticeably stronger with each capability.

Cross-cutting moves serve more than one strategy. By counting each such move separately — with each strategy it served — extra points per deal are obtained for cross-cutting depth.

Penetration is evident in thrusts with more than one move. Long thrusts project the situation forward in time toward the goal or vision. A strategy that manifests a series of moves, building on the results of previous moves to implement each strategy, has a sense of "It grows as it goes," or **Crescit Eundo,** the third level of strategy. Each move after the first one in a thrust receives the points corresponding to its serial place in the thrust — the Nth move in the thrust gets N points — in recognition of the good use of the intellectual capital accumulated in the previous success. For example, Mechatronics implemented their strategy — *Determine interest and benefit to industry and provide competitive/cost advantage to users* — by the following thrust with each move building on the benefits of the previous one to carry the action forward in time towards the goal:

- *Summit Topic: International partners don't dump competitive products in the US.*
- *Mechatronics grants to Infomatics exclusive rights to purchase Robo-APS equipment and all upgrades thereto as applied to all SAMSON class products; Infomatics will pay the greater of $10M per year or 25% of SAMSON Division's increased profitsfor years 8 to 20.*
- *Summit Topic: Obtain equal access to foreign markets.*
- *Motorola will purchase $100M of wafer handling equipment for new plant pending satisfactory installation. Motorola will buy wafer handling equipment for its next 3 plants . Valued at approx. $400M.*
- *Mechatronics will supply Eurolaser with a turn-key, state-of-the-art display manufacturing facility in Europe for $180M. Mechatronics will supply Eurolaser with upgrades at the lowest price offered to other purchasers.*

In principle, there should be an even more sophisticated strategy in which the thrusts supporting a strategy combine synergistically with external trends to create wholly new enterprises. For example, strategies that combine the trends within the games with those outside the games to make new industries, would require such a strategy. A Latin descriptor might be **Impetus Futuro**, or "Force for the Future." One enterprise, with its primary and contingency thrusts, would reinforce the effectiveness of another (or of trends) so that the composite would be much stronger than the simple linear sum of the two. This higher degree of strategy should be the most penetrating and successful but was not found in these Prosperity Games — possibly because of the limited amount of time to play.

Some robustness is obtained by a team's having contingency thrusts for a given strategy. When multiple independent thrusts (independent in the sense that a default on a move within one thrust would not directly jeopardize an independent thrust) support a strategy, the overall plan is assessed as less vulnerable to a default or to a failed technology, so the play is assessed to be more robust. Independent thrusts supporting the same strategy are diagrammed on a separate line with the common strategy and each move in the contingency deal received a +1 bonus point to reward the risk management.

If issues are not addressed at all or strategies are not delineated, substantial vulnerabilities are likely and the team is awarded negative points. An uncovered issue gives the team -5 points. An issue that has deals associated with it but is not covered by an announced strategy is interpreted as deficient in intentional planning and the team was given -3 points. Since obtaining financial backing is implicit in the required strategies, neglecting to list that strategy explicitly was forgiven without penalty.

Defaulting on a deal in life has serious consequences. A default on a deal in Prosperity Games also has a penalty. It gives a team -5 points.

In some cases a deal may be only weakly intentional and substantive, e.g. a simple extension for purposes of reassuring loyalty or a simple purchase of a strategy because money was available through the Toolkit option without requiring any interaction with anyone else. Although we are tempted to derate the value of these deals, we decided such a deration might appear arbitrary. We refrained.

Table 2 summarizes the four levels of strategies presented here.

Table 2. Scoring Strategies For Robustness And Penetration

Level	Information Processing (Development of strategies)	Strategy Decriptors	Logic Analogs
I	Declarative: separate unconnected moves	***Carpe Diem*** - Seize the Day	Disjunctive; or-or
II	Cumulative: connect several different moves, none of which is sufficient, but taken together, they make a strong case	***Partes Pro Toto*** - Parts for the Whole	Conjunctive: and-and
III	Serial: construct a line of thought, a chain of linked moves and thrusts	***Crescit Eundo*** - It Grows As It Goes	Serial; if-then
IV	Parallel: construct several serial thrusts with cross-linking to emerging external trends; develop contingency plans	***Impetus Futuro*** - Force for the Future	Parallel; if and only if

This alignment of issues, strategies, and thrusts (defined by the sequences of moves) with sequentially compounded effects allowed us to diagram the teams' strategies. The resulting diagram for Mechatronics is shown in Appendix G. When the words describing each feature are replaced by the generic descriptor for Key Challenges and Strategies and by a score for each move, a pattern emerges that visually illustrates the penetration (length of a thrust) and robustness (x multiplier) of the strategy, Table 3. The resulting pattern for the Mechatronics Team's play illustrates the process. The points for each move are shown as three numbers separated by commas. The first is the points from the disjunctive (1), conjunctive (2), or serial thrust (# of moves in the series for Moves 2 through 5). The second number is the bonus point for having a robust move that develops a relationship, e.g. by exchange of intellectual property. The third number is the bonus point for the first contingency thrust under a strategy.

Table 3. Block Diagram of Mechatronics' Play

Key challenges	Strategy	Move 1	Move 2	Move 3	Move 4	Move 5	Points
Challenge 1	Strategy 1-1	1,0,0	2,0,0	3,1,0	4,0,0		11
Challenge 1	Strategy 1-2	2,1,0	2,1,0	3,1,0	4,0,0		14
Challenge 1	Strategy 1-3	1,0,0	2,0,0	3,1,0	4,0,0	5,0,0	16
Challenge 1	Strategy 1-4	2,0,0					2
Challenge 1	Strategy 1-4	1,0,1					2
Challenge 2	Strategy 2-1						0
Challenge 2	Strategy 2-2						0
Challenge 2	Strategy 2-3	1,0,0	2,0,0	3,1,0	4,1,0		12
Challenge 2	Strategy 2-4	2,1,0	2,1,0	3,1,0			10
Challenge 2	Strategy 2-4	2,1,1					4
Challenge 2	Strategy 2-5	2,1,0	2,0,0	3,0,0			8
Challenge 2	Strategy 2-5	1,0,1	2,1,1				6
Challenge 2	Strategy 2-5	1,0,0					1
Challenge 3	Strategy 3-1	2,0,0	2,1,0				5
Challenge 3	Strategy 3-1	2,0,1	2,1,1				7
Challenge 3	Strategy 3-1	2,1,0	2,2,0				7
						Total	105

The scoring system we tentatively suggest to quantify these assessments is summarized as follows:

Each isolated or disjunctive deal	1 point
Each deal that was conjunctive	2 points
Each deal that built on the previous situation to carry the action further in time towards the announced goal	+1 point more than the previous move

The Nth move in the thrust gets N points for the moves 2 through N.

Cross-cutting deals to advance multiple strategies counted as many times as they appeared

Deals that were robust because they developed not only exchanges of money for services but also built relationships	+1 bonus point
Each move in the first contingency thrust for a strategy	+1 bonus point
An uncovered issue	-5 points
A default on a deal	-5 points
An issue that had deals associated with it but was not covered by an announced strategy	-3 points.

The scoring system rewards substantive planning with its accompanying robustness, penetration, and team cohesiveness. The rationale for this system was drawn from inspection of the various deals. However, the general hierarchy of strategies--(1) disjunctive, (2) conjunctive, (3) serial, and (4) parallel combinations of serial strategies--corresponds to the four logical processes (disjunctive, conjunctive, conditional, and bi-conditional)[5], to Kohlberg's classification of strategies for making moral judgments[6], and to Jaques' classification of information processing in accountability hierarchies[7]. Each study found a similar increase in value as the strategy shifts from disjunctive, conjunctive, conditional, and bi-conditional.

The National Electronics Manufacturing Initiative is a very challenging undertaking. A successful strategy that implements the Initiative in the interest of public missions and private companies will have to be quite robust and penetrating. The features of successful strategies from Prosperity Games may be useful in stimulating better strategies for the National Electronics Manufacturing Initiative.

[5] Seymour Lipschutz, **Set Theory and Related Topics**, Chapter 14, McGraw Hill, New York, 1964

[6] L. Kohlberg, **The Philosophy of Moral Development**, Harper and Row, San Francisco, 1981

[7] Elliott Jaques and Kathryn Cason, **Human Capability**, Cason Hall & Co., Falls Church, VA 1994

Toolkit Investments

Teams could alter their futures in three ways: By directly investing their funds internally or externally; by negotiating agreements with other teams; and by investing in Toolkit Options, separately or jointly with other teams. The Toolkit technology and policy options were developed in the NEMI roadmap-making exercise; they are listed in detail in Appendix C. The teams' investment strategies and the successful options (determined probabilistically) are shown in Table 4.

Nine technology options succeeded in the first round, and four new (i.e., non-NEMI) options succeeded on the second day's investments. Of these thirteen options, six involved substantial investments by at least three or more teams:

- Robotic controllers for precision alignment (5 teams-$500M)
- Packaging on displays reduces costs & weight by 50% (4 teams-$350M)
- Simulation tools for rapid prototyping (5 teams-$510M)
- Improved thin laminate substrates increase yields by 30% (3 teams-$250M)
- High-resolution 3-D flat panel displays for $150 each (4 teams-$650M)
- Non-invasive neural-based I/O for SAMSON (4 teams-$800M).

The US Government invested heavily in non-

technology policy options, either alone or in concert with the two US companies, Infomatics and Mechatronics. The successful investments included:

- Implement NEMI roadmap (US Gov- $400M)
- Industry and EPA form partnership to improve environmental regulation to reduce cost by 50% (USGov - $200M)
- Joint industry-gov clean electronics initiative (Info, US Gov - $120M)
- States establish workforce training program (US Gov- $150M)
- Repeal Glass-Steagall act (Info, Mech, US Gov - $420M)
- Industry-National Labs consortium (US Gov - $400M)
- Consumption tax replaces income tax (Info, Mech, US Gov - $128.8M)
- Curb abusive shareholder suits (Info, US Gov - $240M)

The Japanese government ignored the NEMI policy options and created eight of their own options, of which five were successful. Most of these represented large investments in educational initiatives associated with SAMSON ($1240M+$50M+$200M).

The Japanese government invested all their initial funds ($2000M) in their own policy options. In contrast, the European government invested nothing in policy options; they invested $1840M (of their initial $2000M) in technology options.

The industry teams invested very little in policy options (onlyInfomatics andMechatronics).

TABLE 4. TOOLKIT OPTIONS: SUCCESS/FAILURE CALCULATION AS A FUNCTION OF TOTAL DOLLARS INVESTED														
TECHNOLOGY OPTIONS - ALL COUNTRIES														
Assume standard deviation = 0.5 x mean (50%) investment														
	Total funds invested ($M)	$M for 50% Proba-bility	Proba-bility	Success or failure	Info-matics	Hori-oka	Schmidt	Mecha-tronics	View-all	Euro-laser	US Gov.	Jap. Gov.	Eur. Gov.
Assets available→					2500	8300	1300	180	320	50	2000	2000	2000
Environment													
Replacement for CFCs at 15% savings	0	200	0.023	Fail									
New lower-cost waste destruction processes	0	160	0.023	Fail									
Board Assembly and Packaging													
Robotic controllers for precision alignment	500	150	1.000	Success	200		35	50			100		115
New lead-free solder with 43% fewer failures	0	180	0.023	Fail									
Process decreases failure rate of PCMCIA devices and lowers costs by 30%	160	160	0.500	Success									160
Packaging directly on display reduces costs and weight by 50%	350	100	1.000	Success				50	50		100		150
Cost-effective packaging on diamond substrates doubles computing power	200	100	0.977	Success	200								
Mfg. Information & Management Systems													
Ind/lab software family integrates design-to-delivery process	150	200	0.309	Fail			50						100
Intell. S/W increases worker productivity by 6%	150	100	0.841	Fail									150
ARPA program provides computer models for replacing extensive prototyping	200	160	0.691	Fail							200		
Rapid Prototyping													
Simulation tools integrated into system that reduces design time from 15 to 4 months	510	140	1.000	Success	280		70		40		50		70
Prototyping breakthrough allows assembly in aluminum at 1 inch per hour	0	140	0.023	Fail									
Photonics													
0.2 micron precision assembly technology improves yields 30% and lowers costs	180	180	0.500	Fail						50			130

	Total funds	$M for 50%	Proba-bility	Success or failure	Info-matics	Hori-oka	Schmidt	Mecha-tronics	View-all	Euro-laser	US Gov.	Jap. Gov.	Eur. Gov.
Assets available→					2500	8300	1300	180	320	50	2000	2000	2000
RF and Wireless													
National lab increases RF data rate by x5	180	180	0.500	Fail									180
New spread spectrum technology eliminates dead spots for higher quality communications	150	200	0.309	Success		150							
Sensors													
Breakthrough in 3-D sensors increases assembly productivity of robots by 30%	0	160	0.023	Fail									
New family of chemical sensors for process diagnostics and control	0	180	0.023	Fail									
Software													
Inference engine for AI S/W allows adaptive learning in computer-driven devices	200	200	0.500	Success			25						175
Substrates													
Improved feeding of thin laminate substrates improves yield by 30%	250	100	0.999	Success	100				50				100
Displays													
Hi-resol. 3-D direct retinal display at $500	210	200	0.540	Fail									210
Hi-resolution 3-D FPDs for $150 each	650	140	1.000	Success		100	70		180				300
{Add your own options here}													
AI-based OS, Mastermind, is successfully commercialized	400	200	0.977	Success	400								
9-9: Super package development	350	150	0.996	Success	350								
9-9: Operating system devel. with new S/W paradigm	450	200	0.994	Success	450								
9-9: Non-invasive neural-based I/O for SAMSON	800	500	0.885	Success	175					200	225		200
Technology Totals	**4440**	**3530**			**1180**	**250**	**250**	**100**	**320**	**50**	**450**	**0**	**1840**

TOOLKIT OPTIONS: SUCCESS/FAILURE CALCULATION AS A FUNCTION OF TOTAL DOLLARS INVESTED													
NON-TECHNOLOGY (POLICY) OPTIONS													
Please modify options to fit your team by substituting the correct country/organization for bracketed expressions; ignore options that are not relevant													
Assume standard deviation = 0.5 x mean (50%) investment													
	Total funds invested ($M)	$M for 50% Proba-bility	Proba-bility	Success or failure	Info-matics	Hori-oka	Schmidt	Mecha-tronics	View-all	Euro-laser	US Gov.	Jap. Gov.	Eur. Gov.
Assets available→					2500	8300	1300	180	320	50	2000	2000	2000
Implement {NEMI} roadmap; make {US} the location of choice for electronics mfg.	400	200	0.977	Success							400		
R&D tax credit made permanent	0	200	0.023	Fail									
Depreciation schedule reduced to 2 years	0	180	0.023	Success									
Do study on low-cost-capital enablers in {US}	0	200	0.023	Fail									
Simplify accounting practices to industry stds.	0	200	0.023	Fail									
Flexible policy on intellectual property rights	0	120	0.023	Fail									
Industry associations and {EPA} form partnership to improve environmental regulation, reducing compliance cost by 50%	200	160	0.691	Success							200		
{FASB proposal on stock incentives fails}	0	60	0.023	Fail									
{Abusive shareholder suits on stock fluctuations are curbed by gov. action}	80	80	0.500	Fail							80		
Gov. establishes focal point for foreign technology monitoring & assessment	0	80	0.023	Fail									
Gov. establishes interagency joint industry-government clean electronics initiative	0	60	0.023	Fail									
Gov. benchmarks global elec. mfg.	0	60	0.023	Fail									
{NEMI} develops global cost-of-capital index	0	40	0.023	Fail									
Government establishes lifelong training policy and practice	0	160	0.023	Fail									
{State} establishes workforce training program	150	120	0.691	Success							150		
Electronics manufacturing priorities identified and funded {in SBIR-STTR}	0	150	0.023	Fail									

	Total funds	$M for 50%	Proba -bility	Success or failure	Info- matics	Hori- oka	Schmidt	Mecha- tronics	View- all	Euro- laser	US Gov.	Jap. Gov.	Eur. Gov.
Assets available→					2500	8300	1300	180	320	50	2000	2000	2000
Infrastructure for technology delivery system established thru {ESC, NEMI, etc.}	0	200	0.023	Success									
{EPA-ARPA}-industry create NII forum for electronics information	0	20	0.023	Fail									
Ind. associations/consortia work with regional, state and federal groups to share information	0	40	0.023	Fail									
Gov. allows some foreign participation in ind/gov. co-funded projects	0	160	0.023	Success									
{NEMI} performs global SWOT assessment	0	60	0.023	Fail									
Industry-government partnership creates infrastructure for virtual enterprises	0	200	0.023	Fail									
{Glass-Steagall act is repealed}	420	200	0.986	Success	200			20			200		
{Companies can keep intellectual prop. rights for innovations developed with in-house funds used on gov. contracts}	0	140	0.023	Fail									
Critical industries encouraged to pursue consortia with national labs	400	200	0.977	Success							400		
{SBIR grants can be used for acquiring patents}	0	40	0.023	Fail									
Gov. subsidizes every school child with a PDA and access to Internet	0	240	0.023	Fail									
{Add your own options here}													
Create foundation to foster educational initiatives and provide SAMSON (Horioka) products	1240	750	0.904	Success								1240	
Reduce European/Chinese trade barriers	100	100	0.500	Success								100	
Create coop agreements with foreign colleges and labs	50	50	0.500	Fail								50	
Gov. relations efforts	50	20	0.999	Success								50	
Cost share Horioka's high-end development thru banking incentives	250	150	0.909	Success								250	

	Total funds	$M for 50%	Proba -bility	Success or failure	Info- matics	Hori- oka	Schmidt	Mecha- tronics	View- all	Euro- laser	US Gov.	Jap. Gov.	Eur. Gov.
Assets available→					2500	8300	1300	180	320	50	2000	2000	2000
Create gov. software initiative; subelement with applications in education													
Establishment of software repository	10	50	0.055	Fail								10	
Guarantee bank loan to Japanese display industry	100	200	0.159	Fail								100	
Curriculum and course development applications	200	150	0.748	Success								200	
Non-Technology Totals	**2270**	**3570**			**200**	**0**	**0**	**20**	**0**	**0**	**1430**	**2000**	**0**
Grand Totals =	**6710**	**7100**			**1380**	**250**	**250**	**120**	**320**	**50**	**1880**	**2000**	**1840**
REINVESTMENTS													
9-9: Consumption tax replaces income tax	128.8	200	0.238	Success	50			30			48.8		
9-9: Reinvestment in "Abusive shareholder suits on stock fluctuations ...."	160	80	0.977	Success	40						120		
9-9: Reinvestment in "... joint industry-government clean electronics initiative"	120	60	0.977	Success	30						90		
Note: Subtotals and totals do not reflect investments and reinvestments made on 9-9.													

Prosperity Games Summit

Each team was invited to contribute agenda items for a summit among the governments of Japan, the United States, and the European Community with proposals that would further the strategies formulated in the morning session. The industry teams were specifically asked to propose agenda items for industry-government partnering. The proposals were fashioned into an agenda for the summit (Appendix B). Each country team proposed one item with the first and second responses by the other two governments.

The Japanese proposed to create a pre-competitive technology and engineering institute for information related electronics.

Japan presented their proposal as a cooperative venture. The European team deferred action and promised to review it at great length, but implied that a significant time would be required before replying. The United States team had an overall negative attitude, pointing out that the US had a twenty-five billion dollar investment in basic R& D and was not willing to give the fruits of the research away by participation in such a completely open forum. The US team hinted that if they were to participate at all, it would be under terms and conditions that are industry led and carefully managed to protect US interests derived from their previous investments in R&D. The vote was a resounding rejection of the Japanese proposal. This was the first appearance of joint US-European block voting against Japan.

Japan then proposed a follow-on resolution: Resolved that the next ten years would be the decade devoted to education and literacy.

Japan made this proposal from the floor to encourage international cooperation in information-related products and services. While addressing a recognized social need of our society, i.e., improvement of education and literacy throughout the world, the proposal would lay the foundation for a rapidly growing market. The supporting proposal was for government enhancement of procurement of education aids in the information age. The proposal passed overwhelmingly.

The United States proposed an agreement on an open architecture.

The proposal was to assure unlimited easy access to the National Information Infrastructure with common standards ensuring rapid access and interoperability with long term cross licenses to form a backbone for a Global Information Infrastructure. The Japanese delegation endorsed the proposal. The European delegation supported the proposal but had concerns and reserved their judgment. The proposal passed as stated with overwhelming endorsement from all parties.

Europe made an omnibus economic proposal.

The European government presented issues proposed by the European company teams that advocated, without elaboration, the following items:

- International standards for inter-operability,
- a more liberal governmental procurement policy,
- the elimination of export controls,

- limitations on local-content requirements,
- access for European companies to the government-supported research and development in the United States and Japan,
- help in establishing trade with China, and
- recognition of patents and other intellectual properties wherever they originate.

In addition the omnibus bill proposed that:

- the United States fix its trade deficit
- Japan open its markets and eliminate its trade surplus
- the United States, Japan and Europe refrain from dumping and other unfair trade practices
- all agree on worldwide communication standards for digital format
- all agree on information security
- the US, Japan and Europe waive the government production investment clause in GATT
- all remove tariffs
- all agree on international retention of patent rights.

In the discussion, the US generally endorsed the proposal, but reserved further consideration on the domestic-content issue. The Japanese worked against the proposal in the strongest possible language and pointed out that the Europeans did not have open markets themselves. A vote was taken, in which the Europeans and the US government representatives voted as a block against Japan. In the process, Japan walked out in protest.

During a "walk in the woods" to resolve the differences, the leaders of the three government teams met to work out agreements. The deadlock was broken by limiting the scope of the agreements to SAMSON technology and products and restricting them further to a subset of the issues that they could agree on. After some discussion, all three parties agreed to and initialed a document to the effect that for SAMSON technology and products—and only for those products—all three parties would develop and adopt international standards on interoperability, reciprocity, intellectual property recognition, worldwide communications in the digital format, and information security. The international recognition of patent rights was endorsed. All markets for SAMSON technology would be open and no unfair trading practices in SAMSON products, e.g., dumping, subsidization or barriers, would be directed by the companies. All other issues would be subject to further discussions.

The European and US teams showed significant distrust of and hostility against the Japanese. The Japanese played a very conciliatory role throughout the summit, even after their opening proposal was soundly rejected. There was an aggressive European move to address every possible agreement in an omnibus bill. The key to unlocking this deadlock appeared to be limiting the scope of the agreement to this major emerging new technology.

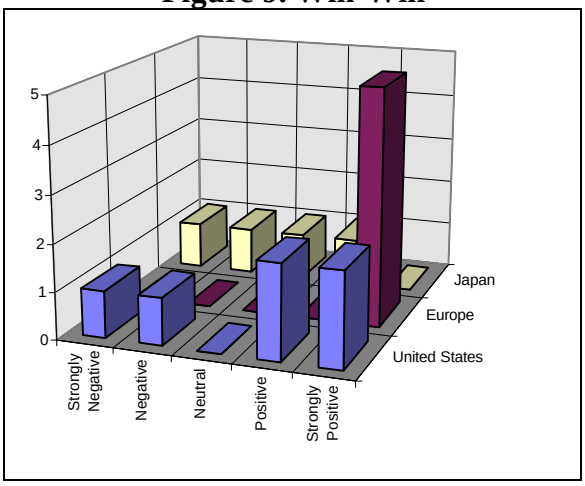
Innovator Voting on Summit issues

The players recorded their interim impressions after the summit by voting on the following questions. Voting ranged from 1 for a strongly negative response, 3 for a neutral response, and 5 for a strongly positive response.

To what extent was business able to identify and persuade government to advance useful and mutually beneficial win-win strategic issues?

As shown in Figure 9, the three regional teams responded very differently on this issue. The European team unanimously agreed (an average score of 5.0) that business was able to craft mutual beneficial issues for their government. The US team gave a split opinion with an average score of 3.5, but with twice as many positive votes as negative. Conversely, the Japanese team had twice as many negative votes as positive for an average score of 2.5; business and government in the Japanese set of teams were communicating poorly in the Prosperity Games .

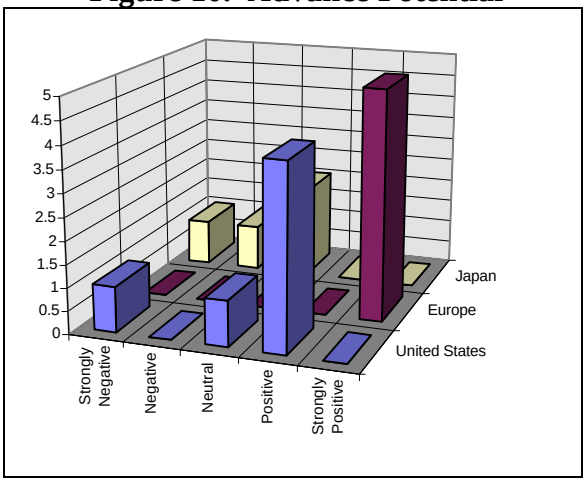
Figure 9. Win-Win



To what extent did the government summit advance the potential for your team's prosperity?

As shown in Figure 10, the European team was very supportive of the summit with a unanimous score of 5 from all players. The US team was substantially positive with an average score of 3.3 and two-thirds of the voters rating 4. The Japanese team was negative with an average score of 2.25, with half the team voting 3, and the rest recording a negative impression. The Japanese team was reporting its dissatisfaction with the two-against-one voting in the summit.

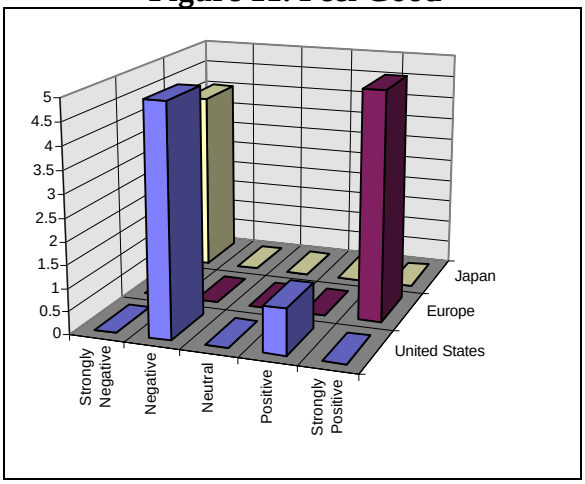
Figure 10. Advance Potential



To what extent did the industry-, laboratory-, and government-partnered activity for the summit feel good?

This question is based on a premise that behavior changes because people change how they think about an issue; people change how they think after they change how they feel. Therefore, feelings are important. The European team was again unanimous in its enthusiasm with an average score of 5, Figure 11. The Japanese were unanimous in their negative feelings for the summit with an average score of 1. The US team was closer to the Japanese with only one reporting reasonably good feelings. We could conclude that the European teams worked well with their government, while the US and the Japanese teams government teams were ignored by their corresponding industry teams.

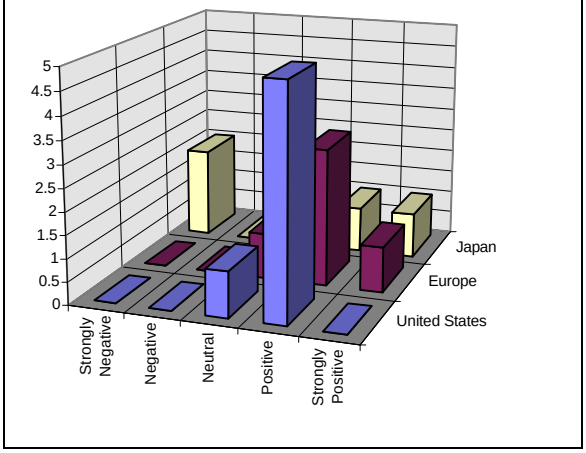
Figure 11. Feel Good



To what extent did industry-led and government-partnered activity in the summit show promise?

The European (average = 4.0) and US (average = 3.83) voting supported the utility of industry-government partnering in the Games, Figure 12. Interestingly, the Japanese were split with two votes near each extreme for an average score of 2.75. Once again, some of the Japanese were feeling unhappy about the inter-team dynamics.

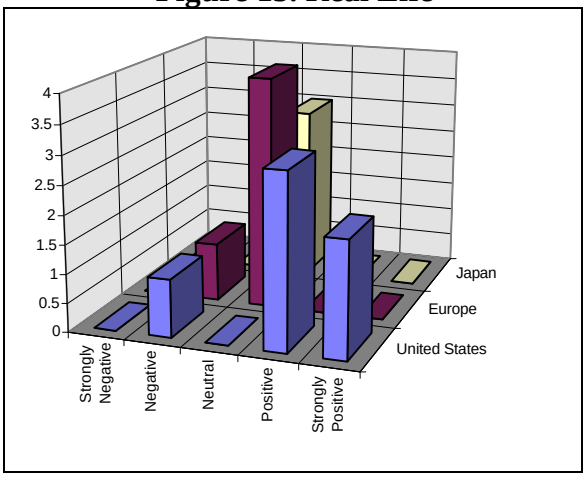
Figure 12. Show Promise



To what extent would industry-led, government-partnered activity be achievable in real life?

The Japanese and the European teams reported slight support for the notion with an average score of 3.0 and 2.80, respectively, Figure 13. The American team was substantially more positive with an average score of 4.0.

Figure 13. Real Life

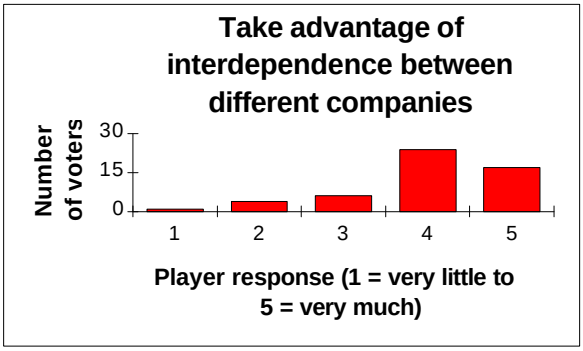


GAME EVALUATIONS BY PLAYERS

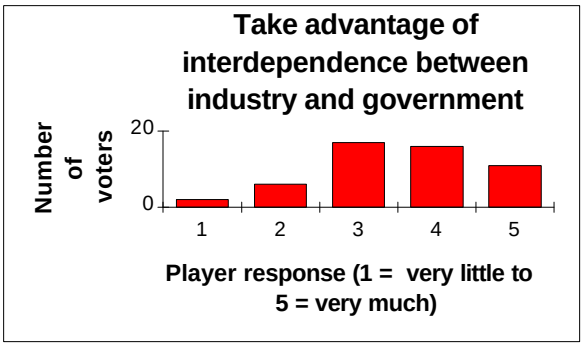
Interdependence

After the opening briefing on Wednesday evening, September 7, the players were asked for their preconceptions concerning interdependence. Three questions addressed the willingness of people to take advantage of interdependence beyond existing adversarial relationships that might exist between 1) industry and government; 2) different regions of the world; and 3) different companies. Responses were based on a scale of 1 =*very little* to 5 = *very much*.

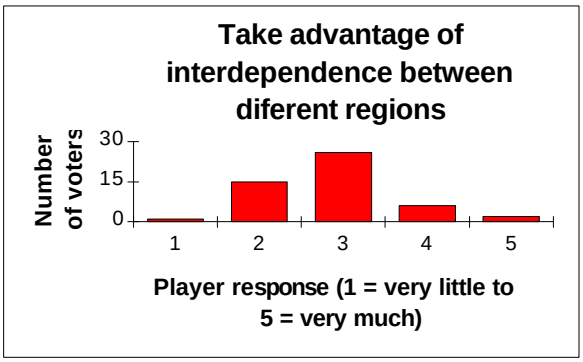
The players were quite optimistic that company-company interdependence would be embraced. 79% voted a 4 or 5, with an average response of 4.0.



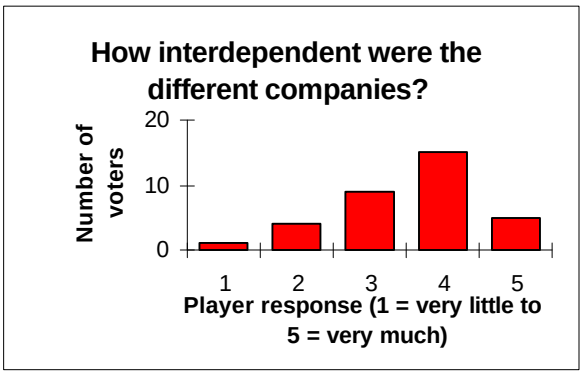
Less optimism was shown toward industry-government collaboration; 52% scored a 4 or 5, with an average score of 3.54.



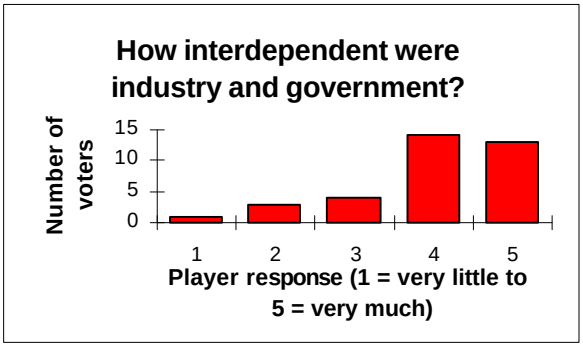
Significant pessimism was assigned to the willingness of different regions (and nations) to cooperate and capitalize on interdependence. Only 16% voted a 4 or 5, with an average score of 2.86.



After the first full day of play, the players were again asked how interdependence developed over the course of the game. The earlier expectations of facile company-company interactions were lower after a day of simulation. The average was 3.56, and the fraction of 4's and 5's was reduced to 59%.



In contrast, the play raised expectations for industry-government interdependence. The fraction of 4's and 5's increased to 77%; the average was 4.00.



Interdependency across regions and nations was slightly lower than expected. Only 11% voted a 4 or 5; the average fell slightly to 2.52.

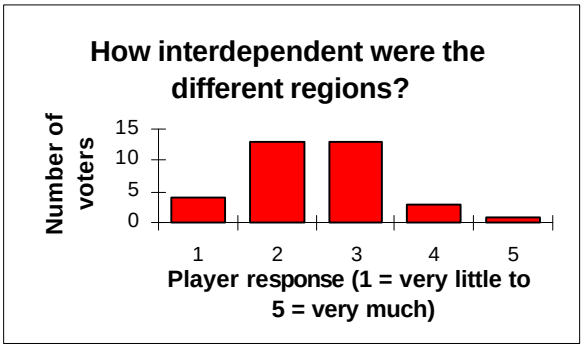
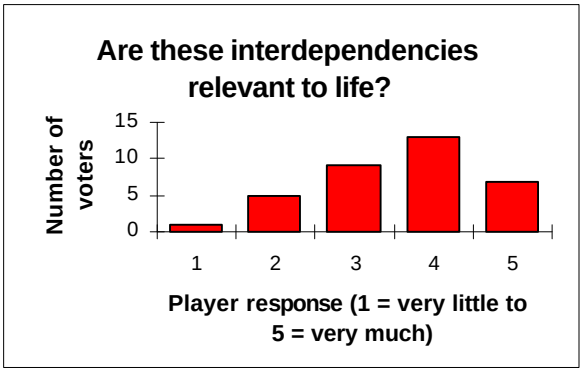


Table 5 illustrates the changes in viewpoint over the course of the first day's simulations. The strongly pro-business view adopted by the government teams appeared to have positively influenced the belief in the potential for positive industry-government partnerships. The lowered expectations for company-company interactions is somewhat surprising considering the number of company-company contracts and agreements that were negotiated as win-win agreements. Cross-regional interdependence appeared to play out according to the players' preconceptions.

Table 5. Interdependency

	Before	After
Company-company	4.00	3.56
Industry-government	3.54	4.00
Region-region	2.86	2.53

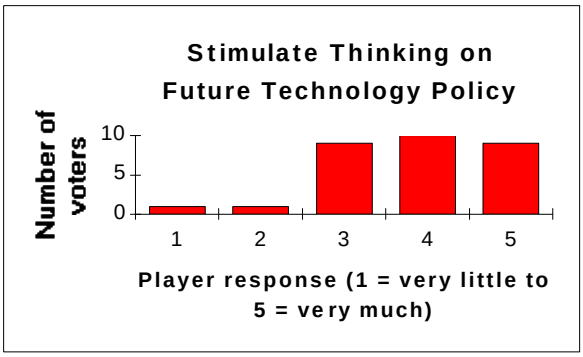
The players generally believed that the simulated interdependencies were relevant to real life. Only 17% assigned a 1 or 2 to this belief; the average was 3.57.



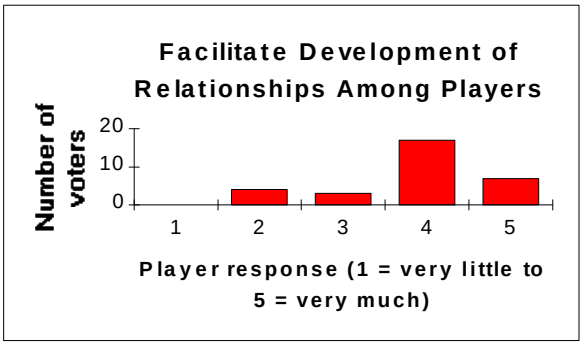
Generic Objectives

As in previous games, the players were asked to evaluate how well this game accomplished the generic objectives of the Prosperity Games. Answers to this set of questions allow us to continue to improve the quality of the games. All answers are based on a scale of 1 = *very little* to 5 = *very much*.

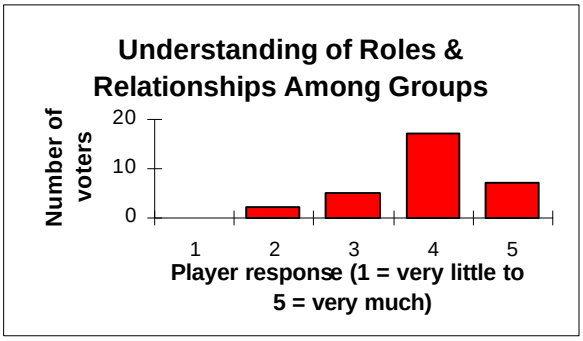
To the question addressing the extent to which the game stimulated thinking on future technology policy, 19 of 30 players voted a 4 or 5. The average score was 3.83.



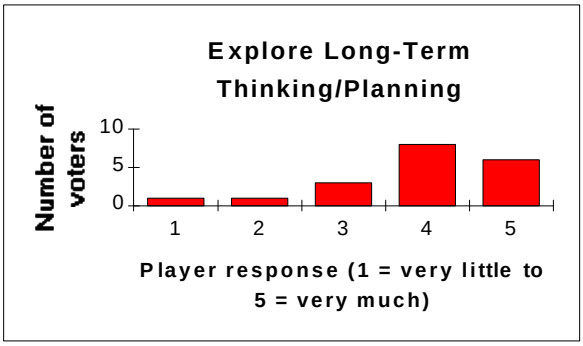
To the extent that the game facilitated the development of personal relationships that would help in the subsequent development of technology policy, 24 of 31 players scored a 4 or 5. The average score was 3.87.



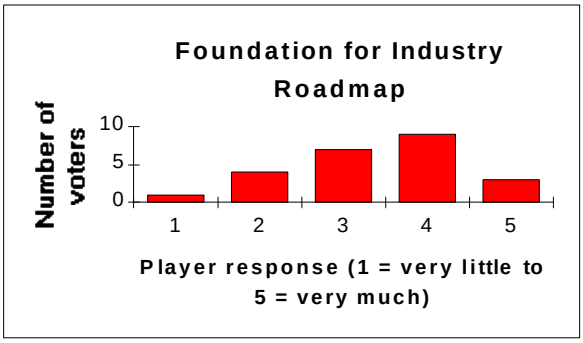
To the extent that the game developed an understanding of the roles, relationships, and interactions among industry, government, labs and universities, 24 of 31 again voted a 4 or 5. The average score was 3.94.



To the extent that the game explored long-term thinking and planning, 74% of the players voted a 4 or 5. The average was 3.89.

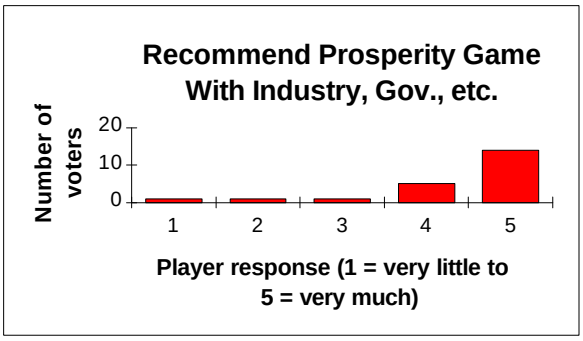


In the precursor AEA game,[8] an average score of 2.5 was assigned to how well the game laid a foundation for making a technology roadmap. Significant improvement was registered in this game with an average score of 3.38.

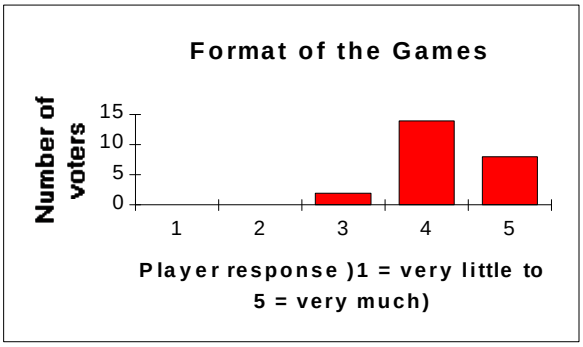


86% of the players would strongly recommend (4 or 5) that technology policy makers play a Prosperity Game with industry, government, labs and universities. The average score was 4.36.

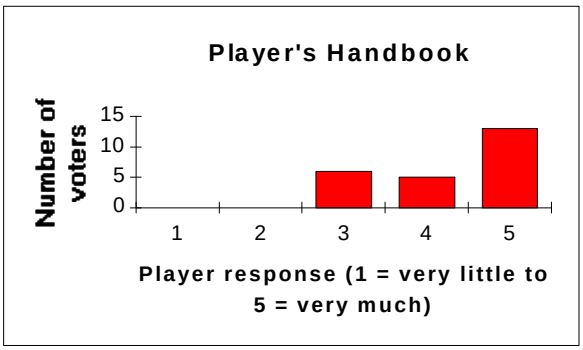
[8]M. Berman and J. P. VanDevender, "Prosperity Games Prototyping with the American Electronics Association," SAND94-1710, August 1994.



The players registered a significant improvement in their evaluation of the game format, compared to the previous AEA game. 92% of the players gave the current game format a 4 or 5. The average score was 4.25, compared to the AEA score of 2.68.



A similar strong improvement in the evaluation of the Players' Handbook was registered. The average score was 4.29, compared to the AEA score of 3.00.



The helpfulness of the Prosperity Games staff continues to improve, going from an average of 4.53 at the AEA game to 4.79 for this game.

Table 6 summarizes the players' evaluations for this game and the previous EIA[9] and AEA games.

[9]M. Berman and J.P. VanDevender, "Prosperity Games Prototyping with the Board of Governors of the Electronics Industries Association," SAND94-0841, August 1994.

TABLE 6: AVERAGE EVALUATION SCORES FOR THE AEA, EIA AND NEMI PROSPERITY GAMES

QUESTION	EIA	AEA	NEMI
Stimulated thinking on future technology policy.	4.07	3.68	3.83
Facilitated development of relationships among players.	3.81	3.63	3.87
Developed roles and relationships among players.	3.33	3.05	3.94
Explored long-term thinking and planning.	4.02	3.68	3.89
Laid foundation for industry to make a technology roadmap.	3.70	2.42	3.38
Would you play a full 2-day game with peers from the 4 groups?	3.74	3.95	na
Would you recommend that technology policy makers play a 2-day game?	4.31	4.16	4.36
Format of the games?	3.31	2.68	4.25
Innovator decision aid?	4.12	4.05	3.38
Players' Handbook?	2.87	3.00	4.29
Inbriefing?	3.30	3.05	3.78
Wrap-up?	3.55	3.00	4.52
Prosperity Game staff helpfulness?	4.09	4.53	4.79
To what extent were you able to play your assigned role effectively?	2.96	3.11	na
To what extent did the players control the content?	4.38	4.42	4.59

LESSONS LEARNED

In a game as complex and ambitious as this one, there are many areas for improvement of the game format and content. Comments were received from players, analysts and facilitators concerning perceived successes and flaws in the simulation. Following are edited highlights of perceived problems, general comments, and suggestions for improvement (in italics), grouped by topic.

FEEDBACK:

- Need a process for rapid feedback of information on contracts, game decisions, announcements, etc. *Use a game copy support/communi-cations/calendar center that would include a continuously updated bulletin board.*

FINANCES:

- *More "real-world" restrictions were needed.*
- Players lacked relevant experience.
- There was too much available money in the game.
- US Bank was overly generous.
- *Need a simple set of financial constraints.*
- *Allow stock prices to fluctuate over course of the game to reflect changing conditions.*
- *Limit funds that government can invest in industry.*
- *Need to keep score for Finance Team.*

- *Financial health of companies and countries should be the score-keeping element, not market share.*

GAME FORMAT:

- Too complicated.
- "We don't have time to assimilate all this."
- "We were able to manage the game complexity."
- *Need to devote time at the beginning of the game to understanding the scenario and developing strategies — before commencing negotiations.*
- *Divide game into periods for contemplation and periods for deal-making.*
- Some teams were overwhelmed by deal-making at the expense of planning.
- Some deals were not carefully defined.
- *Smaller teams needed more players*
- *Retreat-like nature of facility contributed to game success.*
- The model was too unconstrained and too open loop.
- *Teams must be allowed to fail.*
- *Need a true Japanese perspective.*
- *Hold deadlines firm; do not allow late entries.*
- *Incorporate negative scenarios to simulate societal demands on industry and government.*
- Technologies were allowed to develop too quickly on the second day. *Allow creativity but control the timing for breakthrough innovations.*
- *Add a third session.*
- *Need at least 5 players on a team.*
- *Agreements must be carefully and legibly written, dated and signed.*
- *Provide a succinct set of rules.*

GOVERNMENT:

- Governments had too much money and influence.
- Governments were too proactive and pro-business.

ROOTSKA BREAKTHROUGH

- Too contrived
- The introduction of new situations forced teams to refocus and realign objectives.

SCENARIO:

- Realism of SAMSON product and projected market were questioned.
- *Should be business-based rather than technology-based.*
- Scenario was good and rich.
- The scenarios were very well constructed.

SUPPORT MECHANISMS:

- *Need to automate and computerize functions such as tracking, updating, reporting, and announcements. System should also be able to catch errors, such as exceeding the real-time market.*
- *Financial statements should be updated continuously (at the end of each session) by computer.*
- *Consider allowing knowledgeable lab staff to contribute to the games' content.*
- *Games should run like a well-oiled machine.*

TIME (IN THE GAME)

- Need to be more specific about how time elapsed, at what rate, and the total time between the beginning and end of the game. *Define time passage carefully in game schedule; use a game clock.*
- *Should play multiple rounds with fixed time intervals.*

TOOLKIT

- *New Toolkit Options should not be accepted without serious deliberation on outcomes and impacts; if accepted, other teams must be informed immediately.*
- Better information was needed. *Clarify and simplify.*
- The play ... was valuable in determining which technology Toolkit options were valuable....
- Success of policy options is difficult to quantify and reflect in the game; negative

scenarios did not exist (e.g., shortage of trained workers, high interest rates).
- Should (should not) limit openness to write-in options.
- *Add a column that provides the number of years required before the technology becomes commercialized or the policies become effective.*
- For successful options, estimate the effects on market demand, production costs, etc.
- *Provide options specific to foreign governments and some teams.*

In striving for continuous improvement, however, we should not overlook the successes of the game:

- "The design structure of the Game [was]excellent."

- "...In the important things, the Games were highly successful."

- "People liked the negotiating, got deeply into their roles, and saw [that] cooperation may actually be good for you in real life."

- "There was considerable enthusiasm among the players for the game. [They] were unanimous in their belief that the game was a beneficial use of their time."

- "Players and support staff alike found the play of the game exhilarating and fun. The level of excitement was a contributing factor in forming working relationships and camaraderie that will surely outlast the Prosperity Games."

- "It was more stimulating than sports and faster paced than life."

- "Technology was a critical part of the equation."

- "Prosperity Games clearly illustrated the importance of government-industry cooperation for enhancing long-term competitiveness of nations. The Game was engaging and thought provoking. More importantly, the experience helped build relationships that will certainly carry over to the real world."

- "Formed strategic alliances and partnerships with industry and government."

- "Strategic partnering is important."

- "Outstanding experience."

- "One of the most valuable aspects of the [game] was the opportunity to 'network.'"

- "This was the most successful of the Games to date."

- "This very day, I am dealing with the situation — in real life — like the one we explored in Prosperity Games."

- "Availability of timely capital was essential for success in the Games and in life."

- "Just as the Games demonstrated, focused action by the leaders of industry, government, and academia deciding on the goal and focusing the action accomplishes wonderful things."

- "The Prosperity Games vividly illustrated the principle that industry-government cooperative partnerships produce positive results - growth, revenue, jobs, new opportunities."

- "...The two prototype Prosperity Games and the NEMI Game have demonstrated

[a] unique tool for exploring real-life simulation of the dynamics of technology innovation and its commercial exploitation in global markets."

ACKNOWLEDGMENTS

Funding for Prosperity Games development was provided by the US Department of Energy (through its National Laboratories) as part of its mission to promote industrial competitiveness.

We are especially indebted to Dr. Lance Glasser, Chairman of the ESC, for his encouragement and leadership for these games.

The NEMI game required a wide range of expertise. Of 42 support staff, 29 were from Sandia National Laboratories, 1 from the US Naval War College, 1 from Lawrence Livermore National Laboratory, 1 from Microelectronics Research Laboratory, 1 from ARPA, 4 from Systems Planning Corporation, and 5 Sandia special consultants. The ESC and Sandia invited 51 players from industry, government, universities and national laboratories, including 2 from Austria and 2 from Japan. All players and staff committed themselves to the success of this game, and their efforts are greatly appreciated.

For more information, please contact

Dr. MarshallBerman
Manager, Innovative Industrial Alliances
Org. 4271, MS 1380; PO Box 5800
Sandia National Laboratories
Albuquerque, NM 87185-1380
Phone: (505) 843-4229
Fax: (505) 843-4228

APPENDIX A - LIST OF PARTICIPANTS

Name	Company Affiliation	Team
	Eurolaser	
Bayerl, Max	IMS (Austria) Ionen Mikrofabrikations Systeme GmbH	Eurolaser
Carr, Simon	Electronic Indusries Association, Staff	Eurolaser
Englund, Jon	AEA, Director-Technical and Government Business Policy	Eurolaser
Finkelstein, Walt	Advanced Lithography Group, President	Eurolaser
Nelson, Dr. Jennifer	SNL, Manager, Environmental Restoration Technologies	Facilitator
Kemmerer, Lynn	SPC Staff	Analyst
Schoeneman, Paula	SNL, Secretary	Recorder
	European Government	
Fuller, Leon	DOC, Strategic Analysis Division, Office of Industrial Resource Admin.	European Gov
Johnson, Wayne	Auburn University, Electrical Engineering Dept.	European Gov/Univ
Marks, Michael	Michael Marks and Associates, President	European Gov
Pehrson, Dave	Lawrence Livermore National Laboratory, Deputy Associate Director	European Gov
Wilsey, Dr. Neal	Naval Research Laboratory, Head, Electronics Materials Branch	European Gov
Gover, Dr. Jim	SNL/DOC/IEEE	Facilitator
Allen, Dr. George	SNL, Technical Program Manager	Analyst,
Catanach, Pam	SNL, Secretary	Recorder
	Horioka	
Decaire, Dr. John A.	The National Center for Manufacturing Sciences, Acting President	Horioka
Gomi, Norio	Matsushita, Senior Representative	Horioka
Klaiber, Bob	AT&T, Manufacturing R&D Director	Horioka
Pomeroy, John E.	EPP/Dover Technologies, President and CEO	Horioka
Seidel, Tom	Sematech, Chief Technologist	Horioka
Schroeder, Dr. Don	SNL, Program Manager	Facilitator
Sycalik, Gary J.	Innovative Futures Corporation, President	Analyst
Mitchell, Cheryl	SNL, Secretary	Recorder
	Infomatics	
Steve Blumenthal	BBN, VP-Systems and Technology	Infomatics
Donaghy, Jim	Sheldahl, President and CEO	Infomatics
McCloskey, Peter F.	Electronics Industries Association, President	Infomatics
Meieran, Gene	Intel, Technology Manufacturing Engineer	Infomatics
Narath, Al	Sandia National Laboratories, President	Infomatics
Newman, Jeff	California Trade and Commerce Agency, Associate Development Specialist	Infomatics
Sayer, Wayne	Institute for Interconnecting & Packaging Elec. Circuits, Director	Infomatics
Williams, Dr. David	SNL, Manager, Program Development, Electronic Subsystems Center	Facilitator
Boyack, Dr. Kevin	SNL, Innovative Technology Applications Staff Member	Analyst
Nenninger, Connie	SNL, Management Aide/Conference Coordinator	Recorder
	Japanese Government	
Fowler, Charles	DOE, Deputy Program Mgr./Tech. Transfer	Japanese Gov

Glasser, Dr. Lance	Advanced Research Projects Agency, Director-ESTO	Japanese Gov
Kreisman, Norman	DOE, Advisor-Office of Energy Research	Japanese Gov
Prono, Dr. Dan	Los Alamos National Laboratory, Manager, Strategic Planning	Japanese Gov
Vastine, Bob	Congressional Economic Leadership Initiative, President	Japanese Gov
Yarrington, Lane	SNL, YMP System Performance Assessments Staff Member	Facilitator.
Harris, Jeff	Systems Planning Corporation	Analyst
Holland, Elena	SNL/Administrative Associate	Recorder
	Mechatronics	
DeHaven, Robert	Quality Systems, Inc., CEO	Mechatronics
Deininger, Dick	Sematech, Director of National Resources	Mechatronics
Der Torossian, Papken	Silicon Valley Group, CEO	Mechatronics
Narath, Shanna	Martin-Marietta, Director of Strategic Partnerships	Mechatronics
Garcia, Marie	SNL, Strategic Planning Staff Member	Facilitator
Strip, Dr. David	SNL, Manager, Intelligent Systems Principles	Analyst
Faucett, Amy	SNL, Staff Secretary	Recorder
	Rootska	
Wince-Smith, Deborah	Council on Competitiveness, Senior Fellow	Rootska
	Schmidt	
Oppenheimer, Dr. Michael	Inter Matrix, Globalization Consultant, former CEO	Schmidt
Krejs, Dr. Franz	HBB (Austria) Horizonte Beteiligungsverwaltung und Unternehmensberatung	Schmidt
Robertson, Dr. Kathleen	The CNA Corporation, Research Analyst	Schmidt
Jorgensen, Dr. Jim	SNL, Manager, Information Components Manufacturing	Facilitator
McCulloch, Dr. William	SNL, Member of Technical Staff	Analyst
Shaw, Gladys	SNL, Management Aide	Recorder
	US Government	
Alexander, Dr. Jane	Advanced Research Projects Agency, MTO	US Government
Bandy, Dr. William	NSA, Chief, Microelectronics Research Laboratory	US Government
Heggestad, Dr. Harold	MIT Lincoln Labs, Associate Group Leader	US Government
Merrifield, Dr. Bruce	AEA/Wharton, Consultant	US Government
Peercy, Dr. Paul	SNL, Director of Microelectronics and Photonics	US Government
Shapiro, Paul	Environmental Protection Agency, Program Manager, Office of R&D	US Government
Moye, Bill	De La Porte Associates, Senior Consultant	Facilitator
Longerbeam, Dr. Gordon	Lawrence Livermore National Laboratory, Assist to Laboratory Assoc. Director	Analyst
Osburn, Brian	SNL, Secretary	Recorder
	University	
Penfield, Prof. Paul Jr.	MIT, Department Head	US University
Wood, Dr. John E.	University of New Mexico, Professor, Department of Mechanical Engineering	US University
Kelly, Dr. Michael J.	Georgia Institute of Technology/Manufacturing Research Center, Director	Japan University
	Viewall	
Bauer, Dr. Robert S.	Xerox PARC, Commerce in Practice	Viewall
Frendt, Joel	Micron Display Technology, Chief Financial Officer	Viewall
Hoffman, Heidi	USDC/SEMI, Senior Government Relations Coordinator	Viewall
Sakurai, Motoatsu	Mitsubishi International, Senior VP and General Manager	Viewall

Smith, Peter N.	Raychem, Director of Federal Affairs	Viewall
Schmidt, Rod	SNL, Reactor Safety Experiments Staff Member	Facilitator
Williams, Cecelia	SNL, Environmental Restoration Staff Member	Analyst
Barajas, Brenda	SNL, Secretary	Recorder
	Green Team	
VanDevender, Dr.Pace	SNL, Director, National Industrial Alliances	Game Director
Berman, Dr. Marshall	SNL, Manager, Innovative Industrial Alliances	Co-Game Director
Hay, Bud	Naval War College, Director, Advanced Concepts Department	Co-Game Director
Berry, Dr. Ivan (Skip)	NSA, Project Leader, Technology Transfer	Scenario Director
Luhan, Jake	Gaming Consultant, Sonalyst, Inc.	Analyst/Intelligence Dir.
Hoke, Charlie	Standish Industries, President and CEO	Finance/Euopean
Boom, Kristi	SNL, NCAICM Technical Support Staff Member	Finance/Japanese
Wessner, Dr. Charles	Nat'l. Academy of Sciences and Engineering	Finance/US
Post, Bob	SNL, Consultant	Computer Simulations
Ryburn, Alex	SNL, Staff Secretary	Administrative Coordinator
Leaman, Sharon	SPC Staff	Assistant
Stone, Ann	Advanced Research Projects Agency, Executive Assistant	Assistant
Gurule, Adrian	SNL, Member of the Technical Staff	Innovator Technician
Woolsey, Chuck	SNL, News Staff	Media Coverage
Satterfield, Kenneth	SPC Staff	Media Coverage
Ehlers, John D.	Ensar Group, Consultant	Observer

APPENDIX B - AGENDA AND SCHEDULE OF PLAY

Schedule for September 7, 1994

6:00 pm	Registration and cocktails; collect materials; get acquainted
6:45 pm	Barbecue dinner with your team members -- A good time to begin discussing team strategies.
7:30 pm	Welcome - Graham Mitchell, Assistant Secretary for Technology Policy, Department of Commerce, and Dr. Lance Glasser, Electronics Subcommittee, ARPA
7:50 pm	Inbriefing with questions from the audience - Dr. Pace VanDevender, Game Director
8:30 pm	Adjourn and read (or reread) the Players' Handbooks and Technology and Policy Toolkit for next day. Begin considering team roles.

Schedule for September 8, 1994

7:30 am Coffee, tea, and calories

8:00 am Management Committees/Government Cabinets meet to accomplish the following: Discuss the team's nature, financial and technical condition, assets, liabilities, goals. Develop a common understanding of the team itself, and the nature of other teams that affect your team's future. Agree on a decision-making process (consensus, voting, etc.). Develop ground rules for conducting business. Assign specific roles as desired; e.g., negotiating emissary, stationary individuals to receive traveling negotiators, US Senator, State Governor, Japanese trade ambassador, European EC representative, etc. Develop a set of strategic objectives consistent with your business and the culture of your country.

8:40 am Review Issues and Options Facing the Company/ Government as described in the Players' Handbook. Develop a set of priorities.

9:05 am Discuss the Technology and Policy Toolkit Options that you wish to advance with your initial budget allocations. Discuss summit agenda for industry-led, government-partnered action.

9:30 am All teams decide on which issues to pursue with their own country's businesses, which to pursue through legislation or regulation changes, and which need to be discussed with other countries (e.g., trade, government R&D investments in industry, business partnering, etc.). Industry teams provide no more than three issues to their Government teams to be discussed at an international economic summit.[10]

Teams decide on negotiation priorities and assignments to further their strategic objectives and, where desired, to team together on allocation of credits for Toolkit Options.

10:00 am **Each team provides strategy to Green Team along with a list of planned contacts to other teams. Government teams also provide their prioritized issues for an economic summit.**

10:15 am Break: Make appointments for later negotiations

[10]Government teams may propose new legislation within their own countries. These will be evaluated together with the policy options provided in the Toolkit. The passage or rejection of the new (i.e., not in the Toolkit) legislation will be based on a 50% probability if half of the government's credits are allocated to it.

10:30 am Business, Government and Finance teams begin negotiations with emissaries of other teams to identify critical issues, discuss possible agreements, and to pool credits on mutually desired Toolkit Options.

11:00 am **Final team allocations of Toolkit investments are turned in to Green Team.**

Open negotiation period between and among all teams, including finance, to work issues and opportunities.
* Each team selects a spokesperson for short briefings today and tomorrow to the VIP Panel at the end of the game. **Names are provided to the Green Team.***

12:00 Working lunch. {Green Team: Toolkit Options are tabulated, probabilities calculated, successes and failures determined, and the results of the voting are determined.}

1:00 pm Three government teams hold an economic summit to discuss their recommended international issues (as determined by the Green Team from the options provided). Industry teams observe.

2:00 pm Green Team announces the results of the Toolkit voting, and the changes in the scenario that have resulted.

2:15 pm Teams reassemble to discuss their progress and any impacts of the altered scenario, both opportunities and threats.

2:45 pm Open negotiations between and among all teams and finance. Deals are made. Handwritten agreements must now be prepared with date, time, and the signatures of a designated team member from each party; agreements are reported to the Green Team for tabulating of financial commitments. Public posting of each deal is preferred, but optional.

4:00 pm **All written agreements are submitted to the Green Team.**

4:15 pm Teams present summaries of deals in plenary session (3-5 minutes each).

5:00 pm Green Team updates scenario with one technology and one policy issue. Analysts provide their written comments to Green Team.

5:15 pm Meeting adjourned. {5:15 - 6:15 pm: Green Team, analysts and facilitators meet and prepare a presentation based on the day's negotiations and analysts' reports.}

6:30 - 9:00 pm: Dinner; additional negotiations are allowed.

Schedule for September 9, 1994

8:00 am Control Team discusses revised scenario (with new technology and policy events); provides revised estimate of SAMSON market (based on probabilistic estimates) and any other relevant information.

9:00 am Teams meet separately to discuss impact of revised scenarios. New plans are developed. New agreements or revisions of previous agreements are discussed. Plans are made for a new round of negotiations between and among all teams. Toolkit options are reconsidered in the light of the revised scenario. Teams may consider an optional second summit, if desired, to discuss issues identified by industry.

10:30 am Break: **New Toolkit investments and summit requests are submitted to the Green Team.**

10:45 am Negotiations on revised scenarios are conducted to advance team strategies.

10:45 am Optional summit in parallel with final negotiation period.

11:45 am All negotiations are completed. **Written copies of final agreements and contracts are submitted to the Green Team.**

11:45 am Lunch for players. Teams prepare brief written summaries of strategies, negotiations, and expected outcomes (two outline pages).
Working lunch for Green Team and analysts. A final briefing is prepared on the projected outcomes of the business decisions, policies, agreements and legislation. They provide their estimates of the status of the businesses and countries over the next five years.

1:00 pm Game Director briefs VIP Panel on the entire game, major agreements and policy suggestions, and projected outcomes.

1:20 pm Each spokesperson, elected from each team, briefs VIP Panel on insights gained (5-7 minutes each).

2:45 pm VIP Panel comments on priorities.

3:00 pm Meeting adjourned. Record feedback with Innovator. Thank all participants.

APPENDIX C - TOOLKIT INVESTMENTS - DETAILED DESCRIPTIONS OF INITIAL TECHNOLOGY AND POLICY OPTIONS

Indicate the number of US dollars your team wants to spend for each option. The offer by all teams will be added for each option to get a total offering. The probability of an option being implemented increases with the total offering for that option so influencing other teams to add their offers to yours will pay. Please circle your Team

Team	Total Assets (M$)
Infomatics	$2500
Horioka	$8300
Schmidt	$1300
Mechatronics (includes an influence factor of x10)	$180
Viewall (includes an influence factor of x10)	$320
Eurolaser (includes an influence factor of x10)	$50
US/State Government (includes an influence factor of x4)	$2000
Japanese Government (includes an influence factor of x4)	$2000
European Government (includes an influence factor of x4)	$2000

Technology Options	Cost (M$) for 50% chance)	Your offer
Environment		
New environmentally benign family of chemicals are available to replace chlorofluorocarbon solvents without reducing the product yields and at a 15% cost savings compared to the old CFC process for electronics manufacture.	200	_____
Comprehensive family of environmental waste destruction processes reduces the cost of electronics manufacturing waste destruction by 75%.	160	_____
Board Assembly and Packaging		
Recently patented robotic controllers for electronics manufacturing enable precision alignment for high-density board assembly at 70% greater speed, 55% less cost per board, and 3% higher yields than currently implemented process can provide.	150	_____
New, low-surface-tension, lead-free solder has demonstrated 43% fewer soldering failures in board assembly with high-energy density direct-chip-attach, ball-grid-array assembly technology in an environmentally benign process.	180	_____

Patented processes decrease the device failure rate of very complex PCMCIA devices and, therefore, introduce new families of functionalities for PC users at 30% less than the competitor's projected cost. 160 _____

Board Assembly breakthrough lets electronics be packaged directly on the display for a 50% reduction in size and weight. 100 _____

Packaging breakthrough lets electronics be packaged cost effectively on diamond substrates to double the computing power with good thermal management 100 _____

Manufacturing Information and Management Systems

Industry-led cross-fertilization program with national laboratories and universities has developed a family of software applications that integrate the design-to-delivery process for complex, low-cost, mass-marketed electronics. Beta testing by a major OEM demonstrated a sustainable improvement of the learning curve (the % cost reduction for every doubling of the volume manufactured) from 77% to 65%--a world class competitive advantage. Major software manufacturer provides fully integrated and validated applications for your company. 200 _____

Intelligent-agent software demonstrated 30% more effective education and training throughout the factory, managers and employees, at 20% less cost per employee. Beta testing demonstrated a sustainable and affordable increase in worker productivity by 6% per year. 100 _____

ARPA program in manufacturing information systems provides validated computer models for accelerated engineering of electronic products without the need for extensive prototyping and testing. Design cycle time is reduced by 40%. 160 _____

Rapid Prototyping

Validated simulation and modeling tools for electronics design and development have been integrated into an intuitive synthetic environment system that reduces the design time for manufacturing cycle of complex electro-mechanical devices from 15 months to 4 months. 140 _____

Rapid Prototyping breakthrough allows prototypes of complex mechanical structures to be assembled in aluminum by quantum manufacturing techniques at build-up rates of 1 inch per hour (an engine block in 1 day). 140 _____

Photonics

New, 0.2 micron precision assembly technology for electro-optic devices demonstrated 30% improved yields (from 70% to 93%) and corresponding cost reductions in the manufacture of high-volume photonics components. 180 _____

RF and Wireless

National laboratory breakthrough increases the commercial radio frequency data rate for wireless devices between the National Information Infrastructure and unlicensed personal computer systems by a factor of 5 in an industry beta test.The advance permits wireless communications at sufficient speed to keep all mass data storage in home base computer. 180 _____

Breakthrough in spread spectrum technology eliminates the dead spots in cities and office buildings to pave the way for higher quality cellular communications everywhere and for high data-rate wireless communications between personal assistants and central data-base servers. 200 _____

Sensors

Breakthrough in 3-D sensors and associated software increases the productivity of electromechanical assembly robots by 30% for a 15% ($45K) addition to the initial cost of the most commonly used industrial assembly robot. 160 _____

New family of highly selective and very reliable chemical sensors provides unprecedented process diagnostics and control in electronics manufacturing. Industry-national-labs teams increase throughput of validated products by 40% for a 1% increase in the initial cost of the production line. 180 _____

Software

Inference engine for artificial intelligence software allows practical adaptive learning in computer driven devices 200 _____

Substrates

Patented, automatically controllable, continuously variable transmission enables the feeding of thin laminate substrates through high-speed electronics manufacturing devices for a 30% improvement in yield for a 3% increase in the cost of the line. 100 _____

Displays

High resolution, 3-D, direct retinal projection display becomes available at $500/unit.	200	_____
High resolution, 3-D, flat panel display (20 cm by 25 cm) becomes available for $150 each.	140	_____

Non-Technology Options	**Cost (M$) for 50% chance)**	**Your offer**
The implementation of the National Electronics Manufacturing Initiative (NEMI) Roadmap is institutionalized by an industry-led and government-partnered entity, co-funded at the rate of $300M per year (through ARPA's special procurement authority) in the form of a virtual entity with an accountable program management leadership and staff managing pre-competitive research and development performed in industry labs, national labs, and universities as the NEMI managers deem appropriate. The goal is to make the US the location of choice for electronics manufacturing.	200	_____
R&D tax credit is made permanent.	200	_____
Depreciation schedule on electronics manufacturing equipment is reduced to 2 years, in accord with their market utility time.	180	_____
A study is initiated on low-cost capital enablers of economic growth to find ways of making US capital sources more competitive with those of other entrepreneurial countries.	200	_____
Accounting practices for doing business with government are simplified to industry standards.	200	_____
Government establishes a comprehensive and flexible policy on intellectual property rights for all government agencies.	120	_____
Industry associations and Environmental Protection Agency form partnership and improve effectiveness (performance and cost) of environmental regulation and implementation in electronics manufacturing industry, reducing the environmental compliance cost by 50%.	160	_____
A Financial Accounting Standards Board proposal devaluing stock option incentives, currently motivating employees in high-tech companies, fails to be adopted.	60	_____

Abusive shareholder suits over stock fluctuations are curbed by government action. They have been inhibiting companies' going public; high-tech companies were especially vulnerable.	80	_____
Government establishes a focal point for foreign technology monitoring and assessment.	80	_____
Government establishes interagency, joint industry-government, clean electronics initiative.	60	_____
Federal agency benchmarks and assesses global electronics manufacturing technologies.	60	_____
NEMI develops and distributes global cost of capital index on financing electronics manufacturing enterprises.	40	_____
Government establishes lifelong training policy and practice.	160	_____
State agency establishes workforce training programs; assure focus on high skill requirements needed for domestic electronics manufacturing.	120	_____
Electronics manufacturing priorities are identified and funded in SBIR-STTR.	150	_____
An infrastructure for a comprehensive (strategy through deployment) technology delivery system is established through NS&T, CIT, ESC and NEMI implementing institution.	200	_____
EPA-ARPA-industry create a forum in NII (Internet) to distribute information for electronics industry.	20	_____
Regional alliances, industry associations and consortia work with state and federal agencies to share information vital for increasing economic prosperity.	40	_____
Government decides foreign participation in government-industry-funded projects is allowed if domestic economic activity is enhanced sufficiently to justify government investment.	160	_____
NEMI performs global economic assessment of strengths, weaknesses, opportunities, and threats for planning actions in electronics manufacturing.	60	_____
Industry-government partnership creates infrastructure for virtual enterprises to facilitate product realization.	200	_____

Glass Act is repealed to enable banks to hold equity in corporations and increase availability of low cost capital.	200	_____
Companies do not have to give government intellectual property rights for commercial applications of innovations developed with in-house funds when used on government contracts.	140	_____
Industries that are critical to defense, energy, health care, agriculture, the transportation and communication infrastructures, or the environment are encouraged to pursue industry-led and government-partnered and co-funded (through ARPA's special procurement authority) consortia with national laboratories whose core competencies are enabling to the industry. In this manner, industry gains precompetitive technology under industry program management, the government gains closer ties with critical commercial technology for spin-on application to its public missions, and the national labs are de facto re-engineered by the industry influence without forfeiting their responsibilities to the public missions.	200	_____
SBIR grants can be used to pay for acquiring intellectual property protection by patents.	40	_____
Government subsidizes school boards to provide every child (10 to 18) a personal data assistant and free access to the Internet.	240	_____

APPENDIX D - AGREEMENTS AND CONTRACTS

Importance		Funds		Agreement Times												Times
Rank	Terms and Conditions	Transfer	Date	Info	Hor	Sch	Mech	View	Euro	Root	USGv	JGov	EGov	Univ	Fin	Green
	E Gov inv. 300M on behalf of Euro. Euro now controls 45% of the global mkt. Displays predominantly manufactured in Europe.(Suit against Sch dropped)		9/8						?				?			?
	USBank agrees to loan Mech 100M @ Lieborg int. rate. First 2 yrs int only due, pd qtrly; loan amortized over loan yr 3-5. Loan has renewal option in 5 yrs. Addl 100M committed if Glass Act Repeal is supported, same terms as above	USBank to Mech 200M	9/8				1100								1240	(1100)
	Info sells 10,000 low-end SAMSON @ $50 below factory cost to ARPA; units deployed to Univ students who develop apps; increases Info sales 10% yearly		9/8	1125							1125			1125		1130
	Cont. exist agreemt; Info to license OSPC, Hor to supply robot equip and support; 5 yrs; option to extend; broaden to SAMSON		9/8	1150	1212											1212
	View: displays for all Info SAMSON prods Info: exclusive license for non-linear display component; 5 yrs; option to extend		9/8	1230				1234								1251
	Offer to purch. Euro for 15M(approx 50% over mkt value) for 100% of company (Euro M&A board will not block)		9/8			?			?							1252
	Sch: makes available battery tech; Info: makes available Mastermind; consider future joint software dev		9/8	1225		1230										1255
	Fin: line of credit $350M, loan of $200M; Info: seek repeal of Glass ($200M toolkit). If repealed convert $200M loan to equity		9/8	1200											1209	1300
	Invest in high-res,3-D FPD, avail for $150 in following amts: J Gov, 100M; Hor, 100M; View, 80M. Hor can be a 2nd source w/ rights to tech; View has 1st mfg rights		9/8		1127			1129				1112				1300
	Makes an offer for 100% of the stock of View @ $24/share	216M	9/8												1259	1301
	Mech: exclusive right to purchase Robo-ABS equip and upgrades; Info: pay max of $10M or 25% of SAMSON EBIT yearly; years 8-20 of life cycle		9/8	1530			1530									1530
	Hor. to start 5-yr super capacitor battery dev; Hor, 25M/yr; MITI, 25M/yr. MITI can invite other J companies into a consortium & inc. funding or reduce Hor share		9/8		1245							1545				1545

Importance		Funds		Agreement Times												Times
Rank	Terms and Conditions	Transfer	Date	Info	Hor	Sch	Mech	View	Euro	Root	USGv	JGov	EGov	Univ	Fin	Green
	Info,Mech cross-license technologies from toolkit options		9/8	1555			1555									1555
	Info: develop Mastermind for high-end SAMSON, compatible with OSPC; Hor: develop ultra-low pwr chip set		9/8	1555	1600											1600
	Motorola to purc. 100M of wafer handling equip for new plt. Motorola will buy wafer handling equip for next 3 plants pending satis. installation for approx. 400M	Motorola /Mech/100M/Sal	9/8				1600									1600
	Line of cr 0.75B to JGov from World Bank; pymt terms-60mos.		9/8									1550			1601	(1601)
	View to issue 4M shares @ $18; tot price $72,000,000. Pro-ceeds to be used for 50M 2-D facil. expansion to meet expected world-wide demand in SAMSON, $22M to pay off old debt.		9/8					1600							1601	1604
	USBank purchases 35M US equity at 7.50/share; 65M revolving loan renewable at Libor (Mech)		9/8				1605								1605	(1605)
	View will inv. 15M in bio-sensor tech;J Gov. to fund 35M over 3 yrs.		9/8					1600				1610				1613
	View to borrow 40M at Jap prime int. rate w/std pay-back terms; licence agmt. 30M, co-development 5M.		9/8					1159							1200	1615
	Purchase a qty. of SAMSON units for int. ed. at a total cost TBD (# of units/costs listed crossed out)		9/8		1620							1615				(1620)
	Viewl build fac. & prod. eqip for dev/prod of 3-D displays. Contributions: Viewl, 37.5M; Hor, 37.5M; J Gov. 75M		9/8		1614			1612				1610				1620
	US Univ get 10,000 sensors and 500K to deploy.Hor. funds a Fraunhofen Inst. in CA/ann. cost 30M, software eng. for SAMSON; J Gov. funds research at US Univ/J Univ; annual cost 20M.		9/8		1720											1626
	USGv to fund consortium for advanced displays (incl. retinal) led and managed by Info & Mech; support from Univ & Gov labs; 5 yrs funding @ 100M/yr		9/8	1600			1600				1600		1600			1627
	162M loan; cash against line of credit	162M	9/8									1615			1630	(1630)
	Agreed to lend 100,000,000 on 2 yr. revolver at Libor		9/8						1605						?	1630
	Parties agree to each supply 10M to the Eur Univ for adv research in brainwave interface tech for SAMSON		9/9						748				738			(748)

Importance		Funds		Agreement Times												Times
Rank	Terms and Conditions	Transfer	Date	Info	Hor	Sch	Mech	View	Euro	Root	USGv	JGov	EGov	Univ	Fin	Green
	Sch to fund 30M effort at Univ to develop neural net based real time process control sys for use in Sch mfg fac for SAMSON prod to improve mfg qlty & flexibility	30M from Sch/Univ	9/9			835								835		835
	EGov transfer following toolkit investments to Sch as part of consortium:robotic controller; failure rate of PMCIA; rapid prototyping; inference engine; substrates/feed thru laminates(50% position)		9/9			839							825			836
	E. Gov transf following toolkit invts to Euro: Substrates/feed thru laminates(50% position), reduced display pkg.		9/9						825				825			836
	View to manuf displays for all Info SAMSON prods in return for exclusive tech license for non-linear display component; 5 yrs; option to extend; min of ??K units/yr		9/9	835				837								841
	Ukraine accedes to E Union, full membership in 2000		9/9													858
	Est. MOU between US/E Gov for est. of collaborative inst in Eur and US to dev biosensor-controlled brain wave comm. between people/machines with open access to all inst. by all participants; 10M initial funding for each gov.		9/9								850		850			859
	Gr.Team grants excl. patent to Viewall for biosensor sys. who intends to mkt sys, which provides enable for Rootska's infer-ence engine & expands mkt for Info. & Hor'ka. Viewall plans to inc. biosensor in same pkg as their display to reduce mfg. costs.		9/9					900								915
	In exch. for mkt share of Sch displays, Euro to grant Sch pref. treatment w/del. of all displays. Agmt. stands for period of 3 yrs with options.		9/9			?			?							927
	View to be vendor of choice for 70% of SAMSON display needs @ $150/ea, qty of 280,000units in 1999. To work cooperatively to dev. mfg. tech to prod a chip-on-glass display based on Hor tech which View can sell to mkt at large.		9/9		930			931								931
	Rootska employees to be contacted individually; USGv to offer visas, employment assistance for families		9/9	930							930			930		941
	Cong. Dingle committee agreed to investigate alleged infringements by Rootska of MIT and UNM patents. ARPA concurs patents were invented under Gott contract.		9/9								930			?		941

Importance		Funds		Agreement Times												Times
Rank	Terms and Conditions	Transfer	Date	Info	Hor	Sch	Mech	View	Euro	Root	USGv	JGov	EGov	Univ	Fin	Green
	Mech to supply Sch w/prod equip for non-SAMSON applications(automotive). To incl. upgrade of Munich plt(96) and the const of plt in Mex(97). Price of turn-key inst 200M. Munich plt price to be neg as a function of reqmts.		9/9			?	940									945
	Info sponsors Fraunhofer Inst capable of reverse eng domestic and foreign AI software at $50M		9/9	935							935			935		950
	Amended: Info,View; displays to include bio-interfaces and sensors; Info to purchase min of 1M units/yr @ $175 each		9/9	950				951								953
	Hor to not sell displays (doesn't incl "chip on glass" tech) on open mkt. Hor assigning open mkt tech option to View.		9/9		955			950								1000
	Renew existing agreement 5 yrs; option to extend		9/9	1001	1002											1005
	35% equity ownership in new firm to develop SAMSON teaching & training modules based on successful dev. in univ.													?	1010	(1010)
	USGv provides OPIC coverage of USBank loan to Info of $300M for their 40% share of factories in China; USGv forced to postpone banking hearings indef due to time		9/9	1000							1000				1003	1010
	Mech to supply Euro with turn-key display mfg facil in Europe for 180M. Equip to be oper. in 97, Mech will supply Euro w/upgrades at lowest price offered to other purchasers.		9/9				?		?							1011
	USGov & Univ agree when all US Fraurhofer Inst inv foreign firms are being formed in the future. Maj USGov R&D funding agencies to be informed.Univ to adv formation to see if Ameri-can firm is interested & will be incl. on similar terms as for. co.		9/9								955			955		1015
	Create a subsidary for advancement of R&D consisting of tech advances.	Mech/Rootska	9/9				945			1023						1026
	Rootska to join SAMSON consortium follwing signing of other agmts being finalized. Rootska believes that these agmts will not affects its eligibility in the consortium		9/9							1033			1033			(1033)
	Info: set up 7 labs @ $15M/per, help Ukraine envir issues @ $20M, build 4 factories in Ukr @ $200M/per, pay employees at best of US salaries, license fee of 5% SAMSON sales to Root; Rootska: excl license for AI inference engine and s/w to Info		9/9	1030						1015						1036

Importance		Funds		Agreement Times												Times
Rank	Terms and Conditions	Transfer	Date	Info	Hor	Sch	Mech	View	Euro	Root	USGv	JGov	EGov	Univ	Fin	Green
	Hor intends to pur all displays w/View bio sensor sys. Inc 280,000 units Hor agreed to buy in 9/9/94; 9:30 agreement. Bio sensor display sys. to be provided at $175/ea. (AMENDMENT TO 930 AGREEMENT)		9/9		1040			1030								1045
	Hor & Sch to exch battery tech. Hor to sell&support Sch elec assy equip on preferential basis. Hor to cooperate w/Sch for dev of open arch. std & S/W for 3-D SAMSON. Hor to cooperate w/Sch to jointly dev low-power chipsets to exploit Sch battery tech.		9/9		1028	1010										1045
	Dev. SAMSON III-I(int.) prod in Japan w/major part by Sch. Set up trans team to move prod vol to Hamburg plt. Prod to be branded for either Hor or Sch. If prod volume exceeds certain rate, Hor can make excess volume in Japan as agreed to by Sch.		9/9		1028	1010										1045
	World Bank Equities agrees to supply up to 200M for Rootska to dev proprietary tech. In exch we would receive 1% for each 4M invested		9/9							1030					930	1045
	Sch will dist. in Eur exclusively & Hor will dist. exclusively in Far East. For technological advances & new dev., the parties agree to grant each other licensing rights.		9/9		1028	1010										1045
	Collobrate & joint dev. of app & oper SW for: Worldwide auto mkt, new mkt as anticipated, royalties will be paid to Rootska by Sch partnered w/Hor		9/9			945				1032						1045
	View to contract w/US Univ for research of eye in support of board R&D effort to dev ret. disp. tech. Funding to Univ is 200M/yr for 1 yr w/options. US Univ to select J Univ as minority partner.		9/9					1030						1140		1045
	View&Rootska to technically collaborate to leverage the new I/O inference eng. View to tailor its devices to prov optimized I/O capability to the Rootska SW & Rootska will develop the requisite class libraries for the biosensor sys.		9/9					927		1038						1045
	SAMSON U & View will tech collaborate to leverage the excl View biosensor sys with SAMSON U's SSM & STTM transducers.		9/9					1030								1045

Importance		Funds		Agreement Times												Times
Rank	Terms and Conditions	Transfer	Date	Info	Hor	Sch	Mech	View	Euro	Root	USGv	JGov	EGov	Univ	Fin	Green
	Additional $450M line of credit to Info @ prime, real estate as collateral	Fr: WBC to Info	9/9	1047											1047	1050
	J Gov to prov. 50M matched by View for R&D on improv in & keep current Viuew bio sensor for improv perf. of SAMSON; direct retinal display with US and J Univ.		9/9					1030				1140				1050
	Info: excl license to View for retinal disp techn; View: manuf displays and sell to Info; Info: purchase min 60K units/yr 3D-retinal-bioenabled disp @ $550/per; 5 yrs; option to extend		9/9	1102				1100								1105
	R&D on non-invasive human brain I/O, $800M over 4 yrs		9/9	1110					?		?			?		1115
	Borrow 550M to purchase (thru Keiretsu) 21,440,000 shares (5%) @ $26/share of Info (JGov & J. Finance)		9/9									1130			1130	1127
	Invest in Indian SW firm to counter Rootska refusal of proposal. Firm shows exc. progress toward AI based interfaces. 10M		9/9									?			1135	1141
	USState Gov to provide land for 5 yrs(free lease 5yrs w/option for 30 yrs after), 0% prop on bldg and equip for 5 yrs, worker trng for 10,000 mfg empl by yr 5 = 75M. View to spend 75M for plant to be built to productize Info tech for displays		9/9					1143			1144					1144
	Sch makes avail to Mech inference eng on a nonexclusive basis & Mech upgrades 2 proj (upgrade Munich, new plant in Mex free of charge)		9/9			?	1135									1145
	Dell-Webb to build retirement community.Mech to provide automation equip for homes. AARP to support sales to members.	Mech/ $50M plant cost	9/9				?									1146
	E Gov issed 250M in T-bills to raise cash for inv. in EC consortium science & tech dev.	250M	9/9										?		?	?
	Consortium to dev. SAMSON tech estab 9/9/94. Members incl. Eur Gov, Sch & Euro. This is industry led & gov. facilitated		9/9			?			?				?			?
	E Univ offers to send 20 research faculty to Rootska to work in dev. of applications SW for use in education. Will supply workstations for faculty use		9/9							?			?			?

APPENDIX E - NEWS RELEASES

The International Herald Tribune

Vol. CCXXVIV No. 1 Thursday, September 8, 1994 Paris, France

SWISS ORGANIZATIONS REPORT US IS THE WORLD'S MOST COMPETITIVE ECONOMY

Tiananmen Square II Sparks New Debate In The US Over Continued MFN Status For China

Business Leaders Argue Impact on Potentially Explosive Market

MOTOROLA PLANS TO EXPAND IN SCOTLAND

The plant expansion will allow Motorola to produce the most powerful silicon wafers manufactured in Europe.

MAJOR JAPANESE MANUFACTURERS SAY BUSINESS IS IMPROVING

For the first time since 1991, a quarterly business survey indicates an upbeat mood by Japanese manufacturers. Auto sales and new housing starts spurred the Japanese optimism. Others argue, however, that there is little substantive evidence that would signal the end of the recession. Some refuse to accept the sharp increase in US auto sales as a "tide to raise all boats."

GROWING UNREST IN EASTERN EUROPE

Despite frequent rhetoric and more frequent meetings, Eastern European nations continue to question long term commitment to the Partnership for Peace program. Representatives and knowledgeable insiders indicate increasing frustration and cite recent unrest in the Ukraine as a product of the lack of real financial commitment to the "development programs" so frequently cited by politicians. Some politicians have indicated, however, that recent initiatives by US industry, notablyInfomatics, are clear evidence that the program is working.

THE WALL STREET JOURNAL

Vol. CCXXVIV No. 1 Thursday, September 8, 1994 Mt.Weatherall, VA

JOHNSON & JOHNSON TO BUY KODAK DIAGNOSTICS

Johnson & Johnson has agreed to buy Kodak's Diagnostics Products unit for $1.008 billion in cash.

The J&J move is believed to be aimed at reducing dependence on pharmaceutical earnings, and increasing operations in consumer and professional products.

MOTOROLA PLANS TO EXPAND IN SCOTLAND

Motorola plans to spend $384 million to expand its semi-conductor plant in Scotland. The plant expansion will allow Motorola to produce the most powerful silicon wafers manufactured in Europe.

SAMSON-Based Market Is Substantial

Derivative applications for 3-D displays that are under development for the SAMSON high-tech personal communicator are expected to increase world-market sales well beyond the estimated $500 million in 3 years for SAMSON sales alone. Estimates run as high as 10X that for SAMSON alone.

MAJOR JAPANESE MANUFACTURERS SAY BUSINESS IS IMPROVING

For the first time since 1991, a quarterly business survey indicates an upbeat mood by Japanese manufacturers. Auto sales and new housing starts spurred the Japanese optimism. Others argue, however, that there is little substantive evidence that would signal the end of the recession. Some refuse to accept the sharp increase in US auto sales as a "tide sure to raise all boats".

INFOMATICS, INC. IN NEGOTIATIONS WITH RUSSIAN SOFTWARE COMPANY

Under the auspices of the Partnership for Peace Program, Infomatics, Inc., a US end-product manufacturer of electronics and computers for the information age, has opened negotiations withRootska, Ltd. a smallUkranian Software Company that is principally known for its interactive computer game "Quadratures." Spokesmen forInfomatics have indicated that the company is very close to making an exclusive arrangement whereby the two companies would develop proprietary products. Details of the agreement have not be made known.

The New York Times

VOL. CCXXVIV NO. 1 THURSDAY, SEPTEMBER 8, 1994 NEW YORK CITY

Debate Over The Long Term Costs Of Health Care Continues

SWISS ORGANIZATIONS REPORT US IS THE WORLD'S MOST COMPETITIVE ECONOMY

AUTO SALES RISE 10% IN AUGUST

GM Leads The Boom Citing Increases In Productivity As The Key To Increased Market Sales

TAILHOOK
Woolsey C LM
Prosperity Wires
Thursday, 08 1994
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A Federal Judge, at Las Vegas, Nevada, has thwarted a prosecutorial effort by a woman pursuing a sexual abuse complaint against the Tailhook Association."

Tiananmen Square II Sparks New Debate Over Continued MFN Status For China

Business Leaders Argue Impact on Potentially Explosive Market

NEWS FLASH

In a major diversification, Mechatronics, Inc. announces a joint venture with Dell-Webb Homes in cooperation with the AARP to build a new community of retirement homes that utilize intelligent automation to provide truly independent living for the elderly. The first sub-division, Robo-Sun City, outside of Phoenix, will consist of 1000 homes at an average selling price of $450,000 with a $300 monthly maintenance fee. Working through the AARP membership, the partnership has pre-construction commitments on 300 of the 1000 homes.

Mechatronics is investing $100M in plant and technology development. This new business unit reflects the management's foresight in technology acquisition of the Rootska AI technology.

While the firm won't reveal the financial impact, analysts expect that $200K of the unit cost accrues to Mechatronics, with an average profit of 20%.

PRESS RELEASE

Bill Gates has established a software foundation in cooperation with Horioka, Ltd. The grants from the foundation will co-support the already established US-based Software Institute, which is supported by grants from the Japanese Government.

The new initiative will be called the "Gates Software Institute" and will enjoy participation by Gates, Horioka and leading US software engineering staff.

The intent is to rapidly develop highly adaptive, sentient software with open standards that permit rapid development in advanced SAMSON-like products.

PRESS RELEASE

A cooperative venture between the American and European governments has been formed in cooperation with their respective companies, Eurolaser, Infomatics and Mechatronics, along with European and US universities, have agreed to the research and development of non-invasive neuro I/O's. It is anticipated that this research will lead to a prototype device within 4 years.

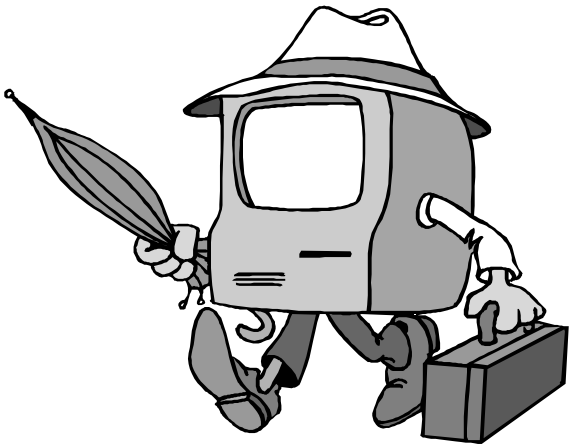
Sentient Software Breakthrough Validated!

An international team of computer scientists has validated the ROOTSKA — a Ukrainian Software Company — "inference engine" that permits truly adaptive, sentient software.

The cognitive processes of computers have gone beyond prescriptive action on instruction sets into the diagnosing or inferential processes of truly self-adaptive processing. The results have been validated by a team of Japanese, American, and European computer scientists invited to ROOTSKA for that purpose. The review team reports that the promise of artificial intelligence in electronic devices may now be achievable, although the development of the new capability will take many years and cost over $100M to commercialize with special integrated circuits and efficient software engineering.

ROOTSKA is a company of only 25 software engineers and computer scientists and has a total staff of 45. Most of their products are in games and entertainment. They have a $2M contract with a Japanese company to develop game programs. Their claim to fame is an interactive, mentally challenging game for PC's and Nintendo systems called Quadratures, which provides $5M annually in royalties.

Surprisingly, their 6-man effort in artificial intelligence software development apparently paid off where other efforts have failed. Their technology could revolutionize the SAMSON product by giving the



operating system a "human" appearance while still maintaining full compatibility with OSPC. In addition, the inference engine could significantly improve the performance of information-driven machines for agile manufacturing of precision electrical-mechanical devices.

ROOTSKA tried to interest Infomatics and Horioka in previous years, but had little success. Demonstrations of their software were severely limited by the hardware testing platform and critical software bugs. The company still needs financial support urgently. They have many talented people who are underpaid. Many are seeking jobs in the US and Japan.

APPENDIX F - TEAMS: DETAILED DESCRIPTIONS, FINANCIAL REPORTS, ACTIONS, AND ANALYSES

Infomatics, Inc.: US Computer Manufacturer

PREGAME SCENARIO

Company structure, assets, and context for decisions

You are a leader in sales of high-tech personal computers, entertainment and communication devices. You are pioneering, in the US, a new class of device utilizing virtual reality concepts, global positioning and world connectivity (generically called SAMSON). Your company had $3B in sales last year with a net income of $200M. You invest $300M annually in R&D. You have a US Government contract totaling $3M, annually, to develop advanced displays and other bio-interfaces, and you have opened discussions with Eurolaser GmbH. about supplying you with some critical display components in the future.

You assemble 30% of your products on shore. Four years ago you were forced to heavily automate assembly and have invested $75M in robotics. This equipment is now in need of up-grade. Some of the best automation equipment for your assembly is manufactured by your direct competitor, Horioka, a Japanese company with 40% market share of early SAMSON devices, in comparison to your 45% market share). A key component, namely 3-D displays, are manufactured exclusively by Viewall, another Japanese Company. You own key patents and intellectual property in software and architecture. These key patents you have licensed to Horioka to obtain these high-tech robotics. Your license agreements with Horioka are due to expire in 18 months.

Your research department has been working on advanced 3-D displays with an annual budget of $15M. You have some good technology, but cannot keep up with the $100M+ R&D in displays being spent by your competitors. You have submitted several white papers for funding your display technology and may shut down the operation if no federal funding is obtained.

You have 5 major manufacturing/R&D centers:

1) Texas - Automated PC assembly plant, featuring advanced automation purchased from Horioka and Mechatronics. This plant generates $600M of sales per year, borrows money at 12% annual interest, uses 120 robots initially costing $300K each, and employs 805 people at labor costs of $15 per hour for a "labor" (people plus debt retirement on automation) annual cost of $19M. The plant produces $8.50 of sales per dollar "labor" cost.

2) Singapore - Automated PC assembly. Produces about 70% of all your PC products. Has low labor costs and a highly skilled workforce. Plant features advanced automation purchased from Horioka. This plant generates $1.4B of sales per year, borrows money at 4% annual interest, uses 203 robots initially costing $300K each, and employs 2907 people at labor costs of $8 per hour for a "labor" (people plus debt retirement on automation) annual cost of $32. The plant produces $10.50 of sales per dollar "labor" cost.

3) Mexico - Produces video, entertainment and telecommunications equipment. This is a brand new plant that consolidates several small production centers around the world. You have invested

$160M in the plant, but revenues have been insufficient to cover the investment. Assembly is somewhat automated, utilizing assembly equipment from Mechatronics and Horioka. (You are beta testing the Mechatronics Robo-APS tool in this plant and are very satisfied with its performance). This plant has your lowest labor costs, but the work force is undertrained. This plant generates $600M of sales per year, borrows money at 10% annual interest, uses 104 robots initially costing $300K each, and employs 1034 people at labor costs of $7.90 per hour for a "labor" (people plus debt retirement on automation) annual cost of $50M. The plant produces $12 of sales per dollar "labor" cost. You have a 3-year tax incentive from the Mexican government which will expire in 18 months. You are working to extend the tax break and if possible sweeten the deal. The Mexican government wants you to bring the SAMSON production to this plant in return for continuing favorable tax credits.

4) California - Military products & pilot line assembly. This plant is charged with the production of the military SAMSON devices. The plant has limited automation equipment, and the highest labor costs. The labor is highly skilled. This plant has your highest cost structure. This plant generates $350M of sales per year, borrows money at 12% annual interest, uses 30 robots initially costing $300K each, and employs 1003 people at labor costs of $20 per hour for a "labor" (people plus debt retirement on automation) annual cost of $107M. The plant produces $3.10 of sales per dollar "labor" cost. All robots in this plant are supplied by Mechatronics.

5) California - R&D center.
Houses 4 R&D activities, Advanced concepts, Software, Displays & Peripherals, and Manufacturing Sciences. The SAMSON concept was developed by your R&D center on a cost-shared DOD contract. The annual budget of the center is $200M.

Specific Issues to be resolved for SAMSON

You have developed SAMSON as a military battlefield communications device on a DOD contract. The DOD program calls for 5000 SAMSON devices to be delivered within 18 months at a price of $17K each. You produce these devices at your California Assembly plant, with extensive manual assembly. This military device is heavy, lacks a fast color display, has limited battery life and has slow performance. Your commercialization goal is within 5 years to produce a full color device for a selling price of $3K and a weight of 3 lbs. with an 8-hour battery life.

Key challenges are:

1) Advanced automated assembly and packaging
2) Better display technology
3) Better software
4) Lower Power Operation
5) Location of Production

Decision I: Automated Assembly and Packaging

To reduce weight and cost of the device, stacked circuits on advanced diamond substrates will be required along with sophisticated assembly and testing. No one can currently produce the automated packaging, assembly and test equipment
needed for the commercial version of SAMSON. Horioka has a major effort in CAD/CAM assembly/testing and plans to have the necessary equipment available in 4 years. Since Horioka is one of

your direct competitors, you have had to offer technology in return for receiving advanced robotics. Mechatronics has also been developing the necessary automation/test equipment under their own funds and with SEMATECH and ARPA contracts. However their long-term viability is in question. New Mechatronics tools (Robo-APS) have been evaluated by SEMATECH as best in the field, but Mechatronics has had great difficulty in getting many sales due to their unstable financial situation.

You will require this advanced automation within 4 years. You have 5 (or more) choices.

Option I-A: Plan on purchasing the automation equipment from Horioka.

> They are your direct competitors. Horioka has traditionally sold their automation equipment openly, but you have fears about depending on key tooling from your competitors.
>
> Horioka has expressed interest in jointly funding the development of automation equipment with you, and is suggesting a $30M (each) per year development program.

Option I-B: Purchase from Mechatronics.

> Mechatronics was once a world leader in robotics equipment, but has been losing market share steadily for the past 10 years. Presently they have about 7% of the semiconductor market share and are in a shaky financial situation. They will require a minimum of $200M of investment capital to remain viable, and an additional $50M per year for the next 3 years to develop the necessary equipment for SAMSON. Recent tools for advanced diamond packaging, developed with help from SEMATECH, have been determined as best in the field by SEMATECH, but as yet Mechatronics has received few orders.
>
> Risks are very high that Mechatronics will go out of business, jeopardizing your ability to produce SAMSON, should you decide to go with Mechatronics. For Mechatronics to be viable, they need financial assistance.

Option I-C: Develop the full automation system in-house.

Option I-D: You may wish to buy Mechatronics or capitalize them.

Option I-E: Advocate a US Government pre-competitive sponsorship of an Intelligent Machine Initiative.

Decision II: Displays

In the military version of SAMSON, the B&W 3-D display is the single largest power consuming device, and adds about 5 lbs. to the device weight. Your display R&D center, as well as Viewall, has been working on a color 3-D display that would cut the power consumption in half, and the display weight to 2 lbs. The display you use in the military product is purchased from Viewall. You have an important patent on a non-linear optical element needed for color 3-D technology, but Viewall has an important patent on quantum-coupled laser diodes, used in the B&W displays and directly applicable to the color displays. Eurolaser has been developing 3-D laser array technology which, if feasible, could substantially improve performance without the need for the expensive non-linear optical elements or quantum-coupled laser technology.

You have been spending $15M a year in R&D on color 3-D displays. Though you have some good technology, a $200M investment will be required to commercialize. Additionally you will have to get a license from Viewall for their quantum-coupled technology, or produce a hybrid utilizing your non-linear optical crystals and Viewall's lasers.

Viewall has been interested in obtaining a license for your non-linear optical technology. Since this is vital to the success of 3-D displays, this patent is a key bargaining chip.

There is much political sensitivity about not having a domestic 3-D display technology.

You have been very satisfied in your association with Viewall in the past. In fact 90% of all of your laptop displays for your traditional PC's are produced by Viewall. You do not want to jeopardize your favorable sales position with Viewall.

Your technical people are very interested in the technology being developed by Eurolaser. Though this technology is in its early stages, it could revolutionize the 3-D display technology and make your and Viewall's patents worthless. Eurolaser is looking for a financial partner and has had many discussions with Viewall.

Option II-A: Negotiate favored treatment with Viewall for displays.

Option II-B: Negotiate with the US Government on a display production initiative to have a US source.

Option II-C: Produce displays in-house Negotiate a license with Viewall for their quantum-coupled laser diode technology, or negotiate a license for the Eurolaser technology.

Option II-D: Negotiate with Eurolaser on a joint venture.

Option II-E: Buy Eurolaser.

Decision III: Software

The present operating system software for the military version of SAMSON is based on your priority PC operating system called OSPC. This operating system is the world's standard for laptop and portable PC personal communicators. You license this operating system to Horioka (and Schmidt) for their PC products, and in return get preferred customer status on automation equipment as well as substantial royalties. Unfortunately, the OSPC is 10 years old and limits performance of SAMSON. Your software group has produced many OSPC patches to stretch the performance of SAMSON while still maintaining software compatibility with OSPC. Horioka has tried unsuccessfully in the past to introduce a new operating system, but the large base of OSPC users has limited the interest in any new operating system. However since SAMSON is a dramatically different technology, compatibility with OSPC is less important.

Your software group has been working on a new AI based operating system called Mastermind, which has only limited OSPC compatibility. This new software can boost performance of SAMSON by 30%.

A Ukrainian software company, Rootska, has claimed to be developing a full OSPC-compatible software package which gets around the OSPC limitations for SAMSON while achieving up to a 180% performance

improvement with substantially increased capability. However claims from this company in the past have proven to be exaggerated.

Option III-A: Renegotiate license agreements on OSPC with Horioka and/or Schmidt.

Option III-B: Buy Rootska.

Option III-C: Capitalize Rootska.

Option III-D: Try to hire Rootska's best software experts.

Option III-E: Abandon OSPC and use Mastermind as the OS for SAMSON.

Decision IV: Low-Power Operation

Under your DOD contract you and a major US semiconductor manufacturer, ICTECH, have jointly developed an ultra-low-power chip set for SAMSON. Under this joint development agreement you have the rights to its use in the US as well as exclusive license rights to Europe and Asia. Use of this chip set along with a new low-power display will meet your performance goals for SAMSON.

Horioka and Schmidt have also jointly developed an ultra-low-power chip set applicable to SAMSON. This chip set is NOT instruction-set compatible with your chip set and is not OSPC compatible. Schmidt has been working on a new battery technology that would increase power output by 40% for the same weight of a conventional battery. The new battery would add about $100 to the cost of each unit. The use of either the new battery or the low-power chip set would meet the 8-hour performance goal. The combination of both would allow 21 hours of use.

Option IV-A: Negotiate a purchase agreement with Horioka and Schmidt for the low-power CPU technology or use the low-power CPU technology jointly developed by you and ICTECH.

Option IV-B: Negotiate with Schmidt for their battery technology.

Option IV-C: Contract for high performance battery development with a national laboratory (US Government Team).

Option IV-D: Develop high-energy-density, rapidly rechargeable, supercapacitors as an alternative to a battery, either in-house or with a national laboratory.

Option IV-E: Work with Horioka and Schmidt to generate operating system, CPU, and interface standards for SAMSON.

Decision V: Location of Production

Option V-A: Since Horioka can manufacture at lower cost, you may want to consider buying/importing SAMSON from Horioka with the stipulation of early access to new designs and upgrades. If so, you may also work to streamline the import process since the US Government is very concerned about the trade deficit.

Option V-B: Enter into a joint development/production effort with Horioka.

Option V-C: Add automation equipment to the Texas plant. This would be the least costly, but your labor costs are higher. This is your preferred option. However since SAMSON production would be a fully automated assembly, your labor unions have concerns about displacing hundreds of low-skilled assembly technicians with a much smaller number of highly skilled technicians and engineers.

Option V-D: Assign SAMSON production to your Mexico plant, which is looking to get the production, since they can get concessions from the Mexican government. However, installation and plant upgrade costs for production would be higher here than at any other plant. Wage rates here are your lowest, but SAMSON assembly will be highly automated, and require more highly skilled technicians and engineers. Also the Mexico plant has excess capacity, and adding SAMSON to Mexico would make the substantial Mexican investment profitable.

Option V-E: Singapore is another option. However, you have concerns over disrupting your PC production line.

Option V-F: Another option is to build a new plant.

Other Opportunities

Examine the Technology and Policy Toolkit for initiatives for your team to push.

RESOURCES AVAILABLE:

Your team initially has $2.5B to spend on making deals and investing in Toolkit Options. Additional funds, if needed, must be raised through borrowing from the Green Finance Team or receiving funds from other teams.

The current price of your stock is $7.50 per share, with 422,416,498 shares outstanding.

INFOMATICS GAME PLAY

Strategy

- Internally control and readily license and develop the best flexible architecture and chip set.
- Extend market at the low end and increase volume
- Acquire marketing expertise
- Agile manufacturing capability
    - own Plant
    - access technology
- "Buy" (includes develop and nurture strategic alliances) best of everything else as it evolves.

Summit Topics

None Given.

First Day Agreements

9/8/94 11:30 AM

Universities, Infomatics, US Government

Infomatics agrees to sell to universities 10,000 early models at $100 each, which is $50.00 below manufacturing cost, and thereby invests $500K. ARPA (the US Government) pays for the units and also $500K fixed costs - total $1.5M. The universities deploy the units. Students develop applications and start 3rd party industry in applications for the company's products, thereby increasing the company sales 10%. This increase remains in future years because of increased public interest in the product.

9/8/94 12:12 PM

Infomatics, Horioka

The parties agree to continue and broaden the current agreement exchanging a license of Infomatics OSPC and upgrades to OSPC for Horioka's robotics equipment and sensors for 5 years with an option to future continue.

9/8/94 12:51 PM

Viewall, Infomatics

Viewall agrees to manufacture displays for Infomatics for use in all Samson products in exchange for an exclusive technology license for Infomatics non-linear display component for a period of five years with an option to extend.

9/8/94 1:00 PM

Infomatics, US Bank

Finance will provide Infomatics a line of credit of $350M at prime rate.
Finance will extend Infomatics a loan of $200M.
Infomatics seeks repeal of Glass Act.
If Glass act repealed Finance will convert $200M loan to equity and consider future equity investment.

9/8/94 3:30 PM

Mechatronics, Infomatics

Whereas Mechatronics grants to Infomatics exclusive rights to purchase Robo-APS equipment and all upgrades thereto as applied to all Samson class products, therefore Infomatics will pay the greater of $10M per year or 25% of Samson Division EBIT for years 8 through 20 of the Samson life cycle.

9/8/94 3:55 PM

Mechatronics, Infomatics

The Parties agree to cross license technologies acquired under the round 1 Toolkit options. The cross license allows each party the right to exercise the joint assets assigned to both parties as granted by the Green Team under round 1 Toolkit options. No funds exchanged

9/8/94 4:00 PM

Horioka, Infomatics

Infomatics agrees to develop Mastermind® for high end Samson products that are compatible with OSPC.

Horioka in return agrees to develop an ultra low power chip set compatible with the new architecture.

Both companies will provide cross licenses of the above.

9/8/94 4:27 PM

US Government, Infomatics, EU Government, Mechatronics

The US Government agrees to fund the formation and operation of a consortium for advanced displays (to include advanced retinal technology) organized, led and managed by Infomatics and Mechatronics, with support from university and Government laboratories, Eurolaser and Schmidt as well as other sources that may be identified later. Funding over the next 5 years of $100M per year. Investment of European companies and Government support is strongly suggested.

First Round of ToolKit Investments and Outcomes

Successful Investments ($M)

Investment	Amount Invested	Partners / *other investors*
Robotic controllers for precision alignment	200	Mechatronics *Schmidt, US Gov't, EU Gov't*
Cost-effective packaging on diamond substrates doubles computing power	200	
Simulation tools for rapid prototyping integrated into a system that reduces design time from 15 to 4 months	280	US Gov't *Schmidt, View, EUGov't*
Improved feeding of thin laminate substrates improves yield by 30%	100	*View, EU Gov't*
AI-based Mastermind OS is successfully commercialized	400	
Glass-Steagall act is repealed	200	*US Gov't, Mech.*
Total successful investments	**1380**	

- Infomatics investment in robotic controllers allowed Infomatics to develop their own assembly tools to reduce their dependence on Horioka.
- Infomatics effectively leveraged their development of Mastermind operating system through a ToolKit investment.
- Infomatics support of the repeal of Glass-Steagall gave them significant influence with finance.

Unsuccessful Investments ($M)

None

First Day End Briefing

- Invest in rapid prototyping.
- Architecture based on Mastermind AI software.
- No final decisions on battery or display for Samson.
- Use Infomatics CPU.
- Assembly tools both internally developed and licensed.
- Negotiated university agreements.
- 10,000 Infomatics Samson units to go to schools via Govt. grant.
- Bet the company on the evolution of Samson.
- US based factories.
- New plants planned.

Second Day Agreements (After Rootska Announcement)

9/9/94 8:41 AM

Viewall, Infomatics

Viewall agrees to manufacture displays for Infomatics for use in all Samson products in exchange for an exclusive technology license for Infomatics non-linear display components for a period of 5 years with an option to extend with a minimum of 50K units.

9/9/94 9:41 AM

Universities, Infomatics, US Government

Each Rootska employee will be contacted individually. The US Government will offer immigration visas and employment assistance to spouses and families. Infomatics or US Universities will offer employment to the Rootska employees.

9/9/94 9:50 AM

Infomatics, US Government, Universities

Infomatics sponsors at $50M, a Fraunhofer Institute capable of reverse engineering AI software, including that of foreign engines. The US Government sees no objection to this. The center will be known as CARE - Center for Advanced Reverse Engineering.

9/9/94 9:53 AM

Viewall, Infomatics

Amended Agreement:

Viewall agrees to manufacture and sell to Infomatics, 3-D displays for use in Samson products in exchange for an exclusive technology license for Infomatics non-linear display components for a period of 5 years with an option to extend for another 5 years. 3-D displays will include the new bio-interfaces and sensors. Infomatics will agree to purchase a minimum of 1,000,000 3-D displays per year. Sales volume increases to be negotiated in good faith each year.

9/9/94 10:05 AM

Infomatics, Horioka

Parties agree to continue and broaden current agreements exchanging a license of Infomatics OSPC and upgrades to OSPC for Horioka robotics equipment. Renew and continue for another 5 years.

9/9/94 10:10 AM

US Government, US Bank, Infomatics

The US Government agrees to provide OPIC coverage of the US Bank loan of $300M to Infomatics for their 40% share of the factories in China. Because of the extreme time pressures associated with expansions into this major new market, the Government will be forced to postpone the banking hearings indefinitely. (*Deal not consummated*)

9/9/94 10:36 AM

Rootska, Infomatics

Infomatics agrees to:

a) Set up 7 worldwide, world class labs at $15M each.

b) Help Ukraine environmental issues to $20M.

c) Build 4 factories at $200M each in the Ukraine for Ukraine Samson.

d)Provide unlimited travel between labs and salaries comparable to the best in the US.

Infomatics shall pay Rootska a license fee of 5% of sales of the Samson product line. Rootska shall provide Infomatics an exclusive license to Rootska software.

9/9/94 10:50 AM

World Bank, Infomatics

The World Bank Consortium provides to Infomatics a $450M line of credit at Prime rate.

9/9/94 11:05 AM

Viewall, Infomatics

In recognition of the criticality of bio-sensors to the demand of Samson products, Viewall will manufacture and sell to Infomatics, 3-D displays based on an exclusive technology license for Infomatics retinal display technology for a period of 5 years with an option to extend for another 5 years. These will include the bio-interfaces and sensors. Infomatics agrees to purchase a minimum of 60,000 3-D retinal/bio-sensor enabled displays per year at $550.00 each. Sales volume increases to be negotiated in good faith each year.

9/9/94 11:15 AM

Universities(US and EU), Eurolaser, US Government, Infomatics

The organizations will enter into a collaborative effort in R&D on non-invasive human brain I/O with necessary signal processing. The effort will total $800M over 4 years.

9/9/94 12:55 PM

Schmidt, Infomatics

Schmidt shall make available its battery and sensor technology. In return Infomatics shall make available to Schmidt the Mastermind operating environment. The parties will be prepared to consider joint development of operating system software.

Final Round of Toolkit Investments and Outcomes

Successful Investments ($M)

Investment	Amount Invested	Partners / *other investors*
Super package development	350	
Operating system development with new software paradigm	450	
Non-invasive neural-based I/O for Samson	175	Eurolaser, US Gov't, EU Gov't
Consumption tax replaces income tax	50	Mech, US Gov't
Abusive shareholder suits on stock fluctuations	40	US Gov't
Joint industry-government clean electronics initiative	30	US Gov't
Total successful investments	**1095**	

Infomatics, and Mechatronics announce the building of a factory to produce advanced retinal displays in 1999 for Samson and other applications

Unsuccessful Investments ($M)

None

Final Briefings

- Strategy could be easily derailed if Horioka and Mechatronics made a deal.
- Initially had no assets, modest display technology. Only had the OSPC operating system as leverage.
- Had several surprises, but parlayed them into opportunities.
- The Government helped but was too cooperative, very unnatural.
- Able to acquire Horioka robotics for rights to OSPC operating system, but remained in direct competition.
- Deals with Mechatronics (though Infomatics was taken to the cleaners) were a useful association.
- Participated in the Advanced Display Consortium.
- Obtained exclusive right to Rootska software through forced threats.
- Established a software reverse engineering effort at a "Fraunhofer-Like" institute.
- Obtained an $800M line-of-credit.
- Obtained a deal with Viewall to supply displays.
- Obtained an exclusive license from Mechatronics for 25% of profits.
- Worked to play Infomatics strengths with partners strength.

Midday Analyst's Report Highlights

- Utilized "if this, then this" strategies
- Had fantastic strategies
- Talked about companies strengths, weaknesses and risks

- Competitively positioned the company globally, feel they blew every-one else off the map.
- Were after dominance and control.
- Felt that the US Government was very (overly) supportive.

ANALYST'S REPORT

Background and Early Planning:

The Infomatics team developed their strategy by going through a SWOT (strength, weakness, opportunity, threat) analysis. They spent a great deal of time with this analysis and subsequent discussions after which the team strategy evolved quickly and naturally. During this time, they turned away representatives from many other teams, explaining that they would like to meet later after the team strategy was solidified.

Much of the team felt that SAMSON was a noncompetitive product with little short term commercial future. Current real technology and sales do not support the assumption that there would be any market for a high cost primitive SAMSON device. One team member said he would get out of the market entirely given Infomatics position. Thus, the product was not felt to be realistic; however, the team did agree to play assuming that the game scenario was valid.

The primary concern and driver in the strategy forming process was to obtain and maintain competitive position in the marketplace. The SWOT analysis pointed out that Infomatics didn't own or control anything that was critical to SAMSON. Control was considered essential to competitive position.

Results from the SWOT analysis led into a three-part approach to define the strategy. This approach was: 1) to define the world-beater product, including what parts Infomatics would need to control; 2) to plan how to acquire the technology and characteristics for the world-beater product, and; 3) to examine relationships, their strength, weaknesses, and needs, and determine where they should go.

Strategy:

Internally develop and control a flexible architecture and chip set which includes the need for an agile manufacturing capability (in our own plants). This architecture should be easily licensed. Be the best in the world in this category.

Buy the best of everything else (components) as it evolves. Develop and nurture strategic relationships and alliances to assure that the components that we buy are made to conform to our standard (both in terms of interfaces and quality).

Develop markets the Japanese way, i.e., start with low end penetration and then improve the product continuously. Develop or acquire the necessary marketing expertise.

Implementation Plan:

Internally invest in the architecture development and make it readily available to others.

Secretly and strategically decouple from the Japanese manufacturing capability; negotiate an extension to the current contract with Horioka to supply OSPC in return for robotics technology upgrades without tipping them off about the desired decoupling. Foster a strategic relationship with Mechatronics, and build an agile manufacturing capability here in the US. Obtain support through the US Government.

Invest heavily in technology ToolKit options that directly impact Infomatics ability to control the architecture of the worldwide SAMSON market. "We want to control our own destiny." This included proposal of a new technology ToolKit option for development of a master architecture that Infomatics would control.

Negotiate contracts with other companies either to jointly develop certain components, or to ensure that their best components are available to Infomatics as needed.

Observations:

Infomatics defined their strategy early and then made all of their decisions based on that strategy. Never did the strategy change or shift. It endured through the entire game, which indicates that it was soundly based. The Infomatics view was that the early agreements that they made covered all of the nit-picky stuff that other teams were coming up with later. Many times a team would approach with some little detail, and Infomatics would respond "Yes, but its already covered." The Infomatics team approached their agreements globally and in good faith, and didn't worry about some of the little things that could bog them down. As a result, they had solid agreements on everything they thought they needed. This included a high degree of global partnering. The other teams came to perceive their strength, and toward the end of the game, everyone was knocking at Infomatics door.

Infomatics had some measure of 'kieretsu,' in that they really wanted a relationship with Mechatronics, and were willing to make some concessions to secure that relationship. However, the same level of 'kieretsu' was not demonstrated toward the US government or universities, although Infomatics was glad to partner with them. Infomatics commented privately that they weren't counting on universities since they were generally slow, and that industry often needed things very quickly.

The Infomatics team was whittled down to only three team members on Friday morning, yet they seemed to be at the very center of the action of the entire game. These three had a very large influence on the outcome of most everything, which I believe is attributable both to Infomatics' central strategy and the players' individual strengths and enthusiasm.

The Infomatics team members obviously felt that they had achieved their objectives, and that if the game had been structured to have a winner, it would have been them.

The concept of game world versus real world is very interesting. I had the feeling, both from watching the Infomatics team, and from watching the late play in general, that the game world was diverging from the real world very quickly, particularly in terms of finances. Certainly one advantage is the stimulation of very creative thinking and negotiation. However, a more structured and realistic game could provide better information regarding current issues.

By way of contrast to the prototype games using the same scenario, the level of play in these games was higher overall since the players were familiar with the industry and enabling technologies. That made the play more realistic in terms of the types of moves they would make. However, the play may have been less realistic in that these players could cut loose a little more than they would in real life since they were only using play money. In the prototype games, the teams seemed to hold the line a little more on money because they had no tie to reality, thus they had to try to create a reality. In this game, the players could get away from reality, since they knew what it was.

Several teams felt that the Rootska announcement was contrived and absurd, and had effectively ended the game. "Its like throwing a big rock in a small puddle," one commented. Although they understood that the purpose was to see reactions to an enormous paradigm shift, they didn't like it, and weren't sure they wanted to continue playing. However, their sporting nature took over. Infomatics decided that they were still in a commanding position and could improve it even more by playing the game.

When a new ToolKit option is proposed, there should be serious consultation between the proposer and the Green team during which the perceived outcomes are defined, agreed to by the Green team, and then enforced (if the option passes) by the Green team in terms of informing other teams that something has occurred that impacts their current/future situation, and giving them some idea of the impact (such as loss of market share or new constraints).

Balance Sheets and P/L Statements

INFOMATICS INC.

ASSETS	Initial Balance Sheet & P/L Statement (In Thousands)		
	1994	1993	1992
CURRENT ASSETS			
Cash and Cash equivalents	77,733	68,741	127,865
Trade accounts receivable (net)	1,206,405	1,153,482	1,126,935
Inventories	1,189,356	965,727	980,637
TOTAL CURRENT ASSETS	2,473,494	2,187,950	2,235,437
PROPERTY, PLANT, AND EQUIPMENT			
Land	137,034	137,034	137,034
Buildings	699,336	637,029	594,015
Machinery and equipment	376,395	329,292	292,026
Less: Accumulated depreciation	195,693	127,194	98,925
	1,017,072	976,161	924,150
OTHER ASSETS	709,632	571,368	542,925
TOTAL ASSETS	$4,200,198	$3,735,479	$3,702,512
LIABILITIES AND STOCKHOLDERS EQUITY			
CURRENT LIABILITIES			
Accounts payable	426,927	402,666	410,367
Accrued liabilities	377,001	387,015	391,203
Current portion of long-term debt	109,620	112,500	107,700
TOTAL CURRENT LIABILITIES	913,548	902,181	909,270
LONG-TERM DEBT	1,097,400	1,194,000	1,260,000
TOTAL LIABILITIES	2,010,948	2,096,181	2,169,270
STOCKHOLDERS' EQUITY			
Common stock, $.01 par value, 2,000,000,000 shares authorized, 422,416,498 shares, 410,572,799 shares, and 340,727,317 shares issued and outstanding	4,224	4,106	3,407
Additional paid-in-capital	1,022,196	661,467	630,999
Retained earnings	1,162,830	973,725	898,836
TOTAL STOCKHOLDERS' EQUITY	2,189,250	1,639,298	1,533,242
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	$4,200,198	$3,735,479	$3,702,512

INFOMATICS INC.

(In Thousands)

	1994	1993	1992
NET SALES	$3,182,220	$2,602,500	$2,262,600
Cost of products sold	1,362,075	1,009,230	886,938
GROSS PROFIT	1,820,145	1,593,270	1,375,662
Operating Expenses:			
Selling, general and administrative	945,120	772,944	671,991
Product development	600,000	570,000	525,000
	1,545,120	1,342,944	1,196,991
INCOME (LOSS) FROM OPERATIONS	275,025	250,326	178,671
Interest expense (income)	9,546	7,809	6,786
INCOME (LOSS) BEFORE INCOME TAXES	265,479	242,517	171,885
Income taxes	54,000	49,596	35,148
NET INCOME (LOSS)	$211,479	$192,921	$136,737

INFOMATICS INC.

ASSETS	(in thousands)		Future		
	1999 All Product Lines	1999 Samson Only	1995 All Product Lines	1995 Samson Only	1994
CURRENT ASSETS					
Cash and Cash equivalents					77,733
Trade accounts receivable (net)					1,206,405
Inventories					1,189,356
TOTAL CURRENT ASSETS	3,285,000		2,502,000		2,473,494
PROPERTY, PLANT, AND EQUIPMENT					
Land	245,000		137,000		137,034
Buildings	1,121,000		763,000	40,000	699,336
Machinery and equipment	863,000		522,000	126,000	376,395
Less: Accumulated depreciation	414,000		260,000	12,000	195,693
	1,815,000		1,162,000	154,000	1,017,072
OTHER ASSETS	1,361,000		707,000	100,000	709,632
TOTAL ASSETS	$6,461,000		$4,371,000	$254,000	$4,200,198
LIABILITIES AND STOCKHOLDERS EQUITY					
CURRENT LIABILITIES					
Accounts payable	623,000		426,000		426,927
Accrued liabilities	430,000		360,000		377,001
Current portion of long-term debt	120,000		160,000		109,620
TOTAL CURRENT LIABILITIES	1,173,000		946,000		913,548
LONG-TERM DEBT	1,250,000		1,550,000		1,097,400
TOTAL LIABILITIES	2,423,000		2,496,000		2,010,948
STOCKHOLDERS' EQUITY					4,224
Additional paid-in-capital					1,022,196
Retained earnings					1,162,830
TOTAL STOCKHOLDERS' EQUITY	4,038,000		1,875,000		2,189,250
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	$6,461,000		$4,371,000		$4,200,198

INFOMATICS INC.

				Future		
		1999	Samson	1995	Samson	1994
NET SALES		$6,219,000	893,000	$3,694,000	116,000	$3,182,220
Cost of products sold		2,658,000	432,000	2,111,000	58,000	1,362,075
	GROSS PROFIT	3,561,000	461,000	1,583,000	58,000	1,820,145
						0
Operating Expenses:	Additional Tooling			737,000	737,000	0
	Selling, general and administrative	1,683,000	46,000	1,031,000	64,000	945,120
	Product development	942,000	120,000	643,000	599,000	600,000
		2,625,000	166,000	2,411,000	1,400,000	1,545,120
						0
	INCOME (LOSS) FROM OPERATIONS	936,000	295,000	(299,000)	(1,342,000)	275,025
						0
Interest expense (income)		(15,000)		(10,000)		9,546
						0
	INCOME (LOSS) BEFORE INCOME TAXES	921,000		(309,000)		265,479
						0
Income taxes		188,000		(63,000)		54,000
						0
	NET INCOME (LOSS)	$733,000		($246,000)		$211,479

Horioka, Ltd.: Japanese Computer Manufacturer

PREGAME SCENARIO

Company structure, assets, and context for decisions

You are a major supplier of these high tech computer and entertainment/communication devices (SAMSON) with 40% market share.

Your factories are highly automated, utilizing equipment developed internally. You are a large, diversified company with annual consumer electronics and computer sales of $10B. Last year sales of SAMSON predecessor type products totaled $40M and you expect SAMSON sales to exceed $500M within 3 years of their introduction. You invest $400M annually in electronics R&D. You have license agreements to use and distribute OSPC from Infomatics and the use of other Infomatics patents for your PC line, but it does not cover SAMSON. You are developing new technologies to circumvent the patent issues, however the priority operating system leaves you with little choice but to negotiate a new license agreement or try to introduce a new operating system which may not have wide acceptance.

You have obtained the patent rights, in the past, due to your strong position in automated assembly. Your high levels of automation allow you to manufacture products at a lower cost/higher margin than Infomatics. This automated assembly equipment is manufactured and sold worldwide by your advanced automation division. This division supplies automation equipment for the semiconductor and electronics industry with annual sales of about $700M.

You are also a manufacturer of CPU's and DRAM. You and Schmidt GmbH. have jointly developed an ultra-low power CPU for SAMSON, which could give you a significant sales advantage. This CPU is not instruction-set compatible with the low-power chip set jointly developed by Infomatics and ICTECH. Your chip set will not run OSPC.

You also purchase your 3-D displays from Viewall.

You have 6 major manufacturing and R&D centers associated with the SAMSON effort.

1) Yokohama - PC assembly
   The world's most advanced & automated PC assembly line. All of your high-end computers and portable computers are manufactured and assembled here. The sophisticated automation allows you to produce PC's at a substantially lower cost with better quality control than your competitors. This plant generates $2B of sales per year, borrows money at 4% annual interest, uses 440 robots initially costing $300K each, and employs 2198 people at labor costs of $16 per hour for a "labor" (people plus debt retirement on automation) annual cost of $150M. The plant produces $9.50 of sales per dollar "labor" cost.

2) Osaka - Telecommunications Assembly
   Manufactures pagers, cellular telephones, portable telephones, etc. This plant generates $2B of sales per year, borrows money at 4% annual interest, uses 294 robots initially costing $300K each, and employs 4162 people at labor costs of $16 per hour for a "labor" (people plus debt retirement on automation) annual cost of $167M. The plant produces $5.50 of sales per dollar "labor" cost.

3) Indonesia - Entertainment Electronics and Computers
Manufactures video games, TVs, VCRs, calculators, printers, and low end PCs. A highly automated plant. This plant has low labor costs. This plant generates $4 of sales per year, borrows money at 4% annual interest, uses 740 robots initially costing $300K each, and employs 6190 people at labor costs of $4 per hour for a "labor" (people plus debt retirement on automation) annual cost of $176M. The plant produces $23 of sales per dollar "labor" cost.

4) Toyonaka - Peripheral Technologies Assembly and Robotics
Here you manufacture and assemble displays and drives for your PC's as well as your advanced robotics. About 30% of all your active matrix displays are supplied by this plant. The remainder are purchased from Viewall. This plant generates $1B of sales per year, borrows money at 4% annual interest, uses 164 robots initially costing $300K each, and employs 1838 people at labor costs of $16 per hour for a "labor" (people plus debt retirement on automation) annual cost of $162M. The plant produces $6 of sales per dollar "labor" cost.

5) Oregon - PC R&D center
Developer of your low-power technology. Runs on an annual budget of $106M.

6) Kyoto - Communication and Computer Technology R&D center
Operates on an annual budget of $210M.

You are a direct competitor to Infomatics in PC's and telecommunication equipment. Your PC's are based on OSPC which you license from Infomatics. You have tried unsuccessfully in the past to introduce your own operating system, but the user base in OSPC is too large. You have obtained the software license agreements by cooperating with Infomatics on robotics, assembly and testing. You have sold advanced robotics as part of this agreement to Infomatics.

Specific Issues to be resolved for SAMSON

Your Oregon and Kyoto research centers are developing a SAMSON type product. The Oregon center is developing one with OSPC as the backbone, while Kyoto is developing an ultra-high performance unit based on a new operating system. Like Infomatics, your commercialization goal is within 5 years to produce a full color, 3D SAMSON device for a selling price of $3K and a weight of 3 lbs. with an 8-hour battery life.

Schmidt has been developing a new battery technology with a 40% higher energy content for the same weight as a conventional rechargeable battery. This battery combined with a low-power chip set will allow SAMSON to operate for 12 hours on a single charge. However, it would add $100 to the cost of SAMSON. You have technology which could reduce the cost of these batteries and may want to talk to Schmidt about cooperation.

Since SAMSON is radically different from standard PCs, a new operating system might be acceptable if you beat Infomatics to market.

Key technical challenges are:

1) Advanced automated assembly and packaging
2) Better display technology
3) Better software
4) Lower Power Operation

5) Location of Production

Decision I: Automated Assembly and Packaging

To reduce weight and cost of the device, stacked circuits on advanced diamond substrates will be required along with sophisticated assembly and testing. Though you cannot currently produce the automated packaging, assembly and test equipment needed for the commercial version of SAMSON, you have a major effort in CAD/CAM assembly/testing and plan to have the necessary equipment available in 4 years. However, the development of these new tools will cost $250M over 4 years. You and Infomatics have talked about a joint development program on CAD/CAM for SAMSON as well as joint software and operating system development.

Option I-A: Buy Mechatronics or capitalize them.

> Mechatronics was once a world leader in robotics equipment, but has been losing market share steadily for the past 10 years. Presently they have about 7% of the semiconductor market share and are in a shaky financial situation. They will require a minimum of $200M of investment capital to remain viable, and an additional $50M per year for the next 3 years to develop the necessary equipment for SAMSON. Recent tools for advanced diamond packaging, developed with help from SEMATECH, have been determined as best in the field by SEMATECH, but as yet Mechatronics has received few orders.
>
> Risks are very high that Mechatronics will go out of business, jeopardizing your ability to produce SAMSON should you decide to go with Mechatronics. For Mechatronics to be viable, they need financial assistance.

Option I-B: Approach the Japanese government to advocate interdependency policy with the US Government and refrain from the US Intelligent Machine Initiative.

Option I-C: Initiate a joint development program with Mechatronics and/or Infomatics.

Option I-D: Agree to purchase robotics from Mechatronics.

Option I-E: Contribute to develop robotics independently.

Decision II: Displays

In the military version of SAMSON, developed by Infomatics, the B&W 3-D display is the single largest power consuming device, and adds about 5 lbs. to the device weight. Infomatics, as well as Viewall, have been working on a color 3-D display that would cut the power consumption in half, and the display weight to 2 lbs. The display used by Infomatics in the military product is purchased from Viewall. Infomatics has an important patent on a non-linear optical element needed for color 3-D technology, but Viewall has an important patent on quantum-coupled laser diodes, used in the B&W displays and directly applicable to the color displays. Eurolaser has been developing 3-D laser array technology which, if feasible, could substantially improve performance without the need for the expensive non-linear optical elements or quantum-coupled laser technology

You have been assisting Viewall in the development of these 3-D color displays and are spending $20M annually in 3-D display R&D in your Kyoto and Toyonaka facilities.

Option II-A: Develop a 3-D display in-house.

> Although you have some good technology, a $200M investment will be required to commercialize your 3-D displays. Additionally you will have to get a license from Viewall for their quantum-coupled technology and a license from Infomatics for their non-linear optical crystals.

Option II-B: Establish a joint venture with Eurolaser.

> Your technical people are very interested in the technology being developed by Eurolaser. Though this technology in its early stages it could revolutionize the 3-D display technology and make your and Viewall patents worthless. Eurolaser is looking for a financial partner and has had many discussions with Viewall.

Option II-C: Negotiate with Viewall to obtain preferential treatment in return for your support of their establishing a joint venture with Eurolaser.

> You have been very satisfied in your association with Viewall in the past. In fact 60% of all of your laptop displays for your traditional PC's are produced by Viewall. You do not want to jeopardize your favorable sales position with Viewall.

Option II-D: Buy Eurolaser.

Decision III: Software

You must decide on the operating system for SAMSON. The present operating system for your PC's is OSPC, a proprietary OS licensed from Infomatics. This operating system is the world's old standard for laptop and portable PC personal communicators. Unfortunately, the OSPC is 10 years old and limits performance of SAMSON. You have tried unsuccessfully in the past to introduce a new operating system, but the large base of OSPC users has limited the interest in the new operating system. Kyoto has been working on a new operating system which has no OSPC compatibility but would provide the best performance for SAMSON products.

A Ukrainian software company, Rootska, has claimed to be developing a full OSPC-compatible software package which gets around the OSPC limitations for SAMSON while improving performance up to 80%. However, claims from this company in the past have proven to be exaggerated.

Option III-A: Renegotiate license agreements on OSPC with Infomatics.

Option III-B: Buy Rootska.

Option III-C: Capitalize Rootska.

Option III-D: Hire Rootska's best software experts.

Option III-E: Develop your own operating system.

Decision IV: Low-Power Operation

The goal for SAMSON is 8 hours of operation on a rechargeable battery. This will require the new display technology plus either a new ultra-low power chip set or a new battery technology.

You and Schmidt have jointly developed an ultra-low power chip set applicable to SAMSON. This chip set is NOT instruction-set compatible with Infomatic's slow-power chip set and is not OSPC compatible.

Schmidt has been working on a new battery technology that would increase power output by 40% for the same weight of a conventional battery. The new battery would add about $100 to the cost of each unit.

The use of either the new battery or the low-power chip set would meet the 8-hour performance goal. The combination of both would allow 12 hours of use.

Option IV-A: License or purchase the low-power chip set being developed by Infomatics.

Option IV-B: Use the low-power chip you are jointly developing with Schmidt.

Option IV-C: Use your own low-power chip set.

> If you elect to use the OSPC operating system, you will be forced to use the Infomatics chip set. If you use your own operating system, you can use any chip set.

Option IV-D: License or purchase the battery technology being developed by Schmidt.

Option IV-E: Approach MITI on funding development of high-performance batteries or super capacitors. Super capacitors would have four times the energy supply and have 60-second recharge, but require 5 years of further development in a $50M per year program.

The use of either the new battery or the low-power chip set would meet the 8-hour performance goal. The combination of both would allow 10 hours of use. The new battery technology would add about $100 to the cost of each unit.

Decision V: Location of Production

Option V-A: You can upgrade one of your existing plants, or build a new plant

> Both Yokohama and Osaka are interested in manufacturing SAMSON, since both plants have excess capacity. However, your Indonesia plant would be the lowest cost alternative.

Option V-B: Build a new plant.

Option V-C: Negotiate a joint development/production effort with Infomatics.

Other Issues and Possible Business Decisions

Since you can manufacture at lower cost, you may want to negotiate the manufacture and export of SAMSON machines for Infomatics. You may want to pressure the Japanese Government on having a tough stand on the trade surplus with the US or about establishing a free-trade agreement with the US.

Examine the Technology and Policy Toolkit for Initiatives for your team to push.

RESOURCES AVAILABLE:

Your team initially has $8.3B to spend on making deals and investing in Toolkit Options. Additional funds, if needed, must be raised through borrowing from the Green Finance Team or receiving funds from other teams.

The current price of your stock is $13.50 per share, with 720,000,000 shares outstanding.

HORIOKA GAME PLAY

Strategy

No initial strategy given.

Summit Topics

I. Standards.
   - A. Software and operating systems
   - B. Architecture
   - C. Frequency definition and bandwidth

II. Global pre-competitive technology.
   - A. University work
   - B. Global Institute of Energy

III. Humanitarian Education.
   - A. Shared government research

First Day Agreements

9/8/94 12:12 PM

Infomatics, Horioka

The parties agree to continue and broaden the current agreement exchanging a license of Infomatics OSPC and upgrades to OSPC for Horioka's robotics equipment and sensors for 5 years with an option to further continue.

9/8/94 1:00 PM

Japanese Government, Horioka, Viewall

CONFIDENTIAL

The parties shall collaborate in investing in the development of 3-D FPD's for $150 each to the following amounts:

Japanese Government	$100M
Horioka	$100M
Viewall	$80M

Horioka can be a second source with rights to the technology. Viewall shall have first manufacturing rights.

9/8/94 3:35 PM

Japanese Government, Horioka

Horioka to start a 5 year super capacitor or high performance battery development. Horioka will spend $25M per year, MITI - $25M per year. The co-sponsored program shall involve Japanese Universities and address environmental concerns on battery end-of-life. The primary technology to be addressed is the high performance battery. MITI can invite other Japanese companies into a consortium and either increase the funding or reduce Horioka's share.

9/8/94 4:00 PM

Horioka, Infomatics

Infomatics agrees to develop Mastermind® for high-end Samson products that are compatible with OSPC. Horioka in return agrees to develop an ultra-low-power chip set compatible with the new architecture. Both companies will provide cross licenses of the above.

9/8/94 4:20 PM

Viewall, Japanese Government, Horioka

Viewall agrees to build facility and purchase equipment for the development and production of new 3-D displays. Contributions to the new facility are:

Viewall	$37.5M
Horioka	$37.5M
J. Govt.	$75M

9/8/94 4:26 PM

Universities, Japanese Government, Horioka

1) US Universities to get 10,000 Samson units and $500K to deploy them. Horioka funds a Fraunhofer-like Institute in California at an annual cost of $30M (after 3rd year, with a start up level of $15M per year for 3 years). The Japanese Government funds basic research at several US and Japanese Universities at an annual cost of $20M; the topic of research is environmentally sensitive, cradle to grave, manufacturing and disposal.
2) Topic of the Fraunhofer Institute is software engineering of system software for Samson.
3) Basic research benefits electronics manufacturing (not just Samson) worldwide by reducing manufacturing costs annually to $500M.
4) Applications to the Horioka machines increase the Horioka sales henceforth by 10%.
5) The benefit of the Fraunhofer Institute to Horioka is to reduce time to market of next generation of Samson by one year.

First Round of ToolKit Investments and Outcomes

Successful Investments ($M)

Investment	Amount Invested	Partners / *other investors*
New spread spectrum technology eliminates dead spots for higher quality communications	150	
High resolution 3-D FPD's become available for $150	100	Viewall, *Schmidt, EU Gov't*
Total successful investments	**250**	

Unsuccessful Investments ($M)

None

First Day End Briefing

- On a 3 year cycle.
- Develop 2 new products at years 3 and 6.
- Investing in displays and RF opportunities.
- Participating in 3-D display development with the J. Government, and Viewall.
- Global marketing low-end units to universities, including American Universities, project 15-30M after 3 years.
- Have an agreement with Infomatics on the operating system.

Second Day Agreements (After Rootska Announcement)

9/9/94 9:30 AM

Viewall, Horioka

Viewall shall be the vendor of choice for 70% of the Samson display needs. These standard 3-D displays will be provided at $150.00 each in a quantity of 280,000 units in 1999. In addition the parties will work cooperatively to develop manufacturing technology for producing a chip-on-glass display based on Horioka technology which Viewall can sell to the market at large when a time or market size target is met.

9/9/94 10:05 AM

Infomatics, Horioka

Parties agree to continue and broaden current agreements exchanging a license of Infomatics OSPC and upgrades to OSPC for Horioka robotics equipment, and renew and continue for another 5 years.

9/9/94 10:45 AM

Schmidt, Horioka

I. Horioka agrees to exchange its low cost battery production technology for Schmidt's agreement to share Schmidt battery technology.

II. Horioka will sell and support Schmidt electronic assembly equipment on a preferential basis (including upgrades).

III. Horioka will cooperate with Schmidt for development of an open architecture standard and software for a 3-D Samson. (Possibly including emerging alliances.)
IV. Horioka will cooperate with Schmidt to jointly develop an ultra-low power chip set to exploit Schmidt's low-cost, long-lived battery technology.
V. Horioka will cooperate on the development of Samson integrated products in Japan with major participation by a Schmidt team. Including:
    A. Set-up of a transfer team to move production volume to Schmidt's Hamburg plant.
    B. Product to be branded for either Horioka or Schmidt as required by market penetration.
    C. If production volume exceeds certain rate, Horioka can make any excess volume in Japan as agreed to by Schmidt and Horioka.
    D. Schmidt will distribute in Europe exclusively and Horioka will distribute exclusively in the far east. (One year after introduction, Schmidt shall make Horioka branded product for Horioka for sale in Europe. Horioka agrees for 5 years to sell only Schmidt produced product in Europe, with reciprocal agreements in the far east. If capacity is limited, parties will mutually agree on added factories locations).
    E. For technological advances and new developments the parties agree to grant each other cross licensing rights.

9/9/94 10:45 AM
Viewall, Horioka

Due to the development of the enhanced bio-sensor capability, Horioka intends to purchase all its displays with the unique Viewall bio-sensor system. This includes the 280,000 units Horioka had agreed to purchase in the 9/9/94-9:30 agreement. The bio-sensor display system will be provided at $175.00 each.

Final Round of Toolkit Investments and Outcomes

Successful Investments ($M)

None

Unsuccessful Investments ($M)

None

Final Briefings

I. Major achievement was deal with Schmidt.
II. Viewall will supply the majority of displays for Horioka Samson.
III. The Japanese Government participated with Horioka in advanced battery development.
IV. Introduced Horioka Samson into the education systems throughout the world.
V. Developed 4 generations of Samson.
    A. Generation 3 included chip-on-glass technology through partnership with Schmidt.
VI. Overall pleasant experience.
VII. Was able to manage the game complexity and successfully blocked out interruptions and diversions.

VIII. The assumptions made by teams not well shared or understood.
IX. Information and timing are key.
    A. Regional, historical and Government partners came first.
X. Had a BIG company mentality.
    A. Conservative attitude: Did not want to bet the company on one technology.
    B. Resourced the program from inside first. More so by a real Japanese company.
XI. NEMI Toolkit opportunities were not a factor.
    A. Government participation may be misleading.
XII. Games could be expanded and repackaged.
XIII. The facilitator's role was important especially at the start.
XIV. The Team was analytic at first, then the competitive juices dominated.
XV. We wanted to organize from top down and take a wait and see attitude by intent and use our major resources once a path was known.

Midday Analyst's Report Highlights

- Had a well-to-do company attitude
- Autonomous state, real life, small companies moving faster than large ones.
- Hard to restrict creative expression.
- Team had a natural coordinated movement.

ANALYST'S REPORT

GAME OVERVIEW - OBSERVATIONS AND SUGGESTIONS

STATED OBJECTIVES VS. GAME RESULTS

The Game provided very interesting and stimulating dynamics among the corporate, government, and university teams resulting in innovative relationships being developed by these interactions. The resultant interactions stimulated innovative thinking from most team members relative to the triune team relationships and tended to broaden the scope of team members' international perspectives.

The initial impression based upon incomplete information, acquired by the analyst, is that there was little progress made on potential future legislation included in the Toolkit. The initial impression based upon incomplete information, acquired by the analyst, is that there was little progress made on the NEMI roadmap evaluation via the Toolkit items voting by asset allocation.

After Game analysis is completed by Game officials, it appears probable that there could be long term strategies and policies extracted from the Game's activities regarding the development of better symbiotic relationships among universities, corporations, and governments; specifically relative to technology development in federal laboratories, and the commercialization of this technology in the private sector in conjunction with governmental legislative programs, private corporations, and university programs.

GAME DESIGN CONSIDERATIONS:

Creativity vs Control
The balance between creating a space for creativity and innovation versus the establishment of parameters, constraints, controls, and other general restrictions was good; however, it could be enhanced by providing certain clarifications of information provided in the initial document, furnished to each team member.

FINANCIAL TEAM
The Financial Team played a crucial role in the unfolding of the Game since financial resources, applied to a given scenario significantly impacts that situation. The Game was structured such that some corporate entities were moderately financially solvent, some financially destitute, and some with very large assets. Since Government Teams and University Teams were also submitting financial "deals" for approval by the Financial Team, it is apparent that the decisions by the Financial Team drastically impacted the Game's direction and results.

Based upon a cursory knowledge of the Financial Team's decisions, it is concluded that, the Financial Team impacted the Game's direction in a manner that would not have occurred if the Finance Team members were restricted to guidelines based upon "real world" financing policies. This restriction would not undermine Game creativity; however, it would provide a more realistic baseline upon which game creativity could function.

GOVERNMENT TEAMS
The government teams, in some cases, demonstrated great alignment with the corporate team from the same government region, especially the European Government, and thus played a major role in the strategy and success of the corporate team (Schmidt). The Japanese Government team appeared to take a broader viewpoint, and this, in conjunction with the internal focus of Horioka team members, resulted in contractual agreements with moderate impact on Horioka team's results. In some cases the decisions of the government team appeared to be unrealistic relative to the scenario; however the creative aspects of some government activities provided entrepreneurial stimulation.

UNIVERSITY TEAM
The University Team, provided an unusual element of entrepreneurship, and generated much activity resulting in several innovative agreements between corporations and the university, some of which might prove very interesting if extended conceptually.

PROBLEMATIC AREAS
Game "Time" Problem: There was a definite problem with Game time. Specifically, the players were uncertain as to when, in the time stream, the Game began with reference to charts, such as the market share development chart for SAMSON. There was apparently confusion with respect to "Control" since the answer, initially provided to a question in this area, was subsequently changed.

There was also great player confusion relative to how time elapsed, at what rate, was time lapse uniform or nonuniform, and how much time elapsed from Game beginning to ending.

Solution:

1) Provide information in the player Information Kit which specifically addresses this subject in a lucid manner.

2) Create a clock system, automatically or manually updated, for each team site, divided into four quarters, which depicts the total time period of the Game, i.e., ten years, with a mechanism for moving the clock appropriately as time passes. A quarterly segmentation is commensurate with the sports mind-set and report deadlines to "Control" (Green Team) could be made to coincide with this quarterly segmentation.

Feedback Problem:

The procedure utilized to provide feedback to the team players, from the Green Team, relative to decisions on contracts submitted for approval, answers to inquiries, clarifications, written and verbal announcements, etc. was carried out in a manner insufficient for the team to be able to keep abreast, in a timely manner. When the feedback arrived, it was submitted to the team singularly, that is, as one document, or one verbal statement. While this system would function well in other circumstances, it does not function well in a circumstance of artificial rapid time expiration, coupled with the absence of team members, who upon their return in many cases, were not advised of the feedback information, due to other pressing matters at the time of their return to the central team site. This problem was exacerbated because the Green Team did not receive input in a manner that enabled them to handle the work-load and respond in a timely manner to be discussed separately.

Solution:

Any feedback, contracts, announcements, etc., to a team could be routed to a copy support center, where copies for each team player and each support team member would be made, and then delivered to each person, or in their absence from the team site, placed in a designated "incoming communications" area for that person. An additional copy could be placed on a Chronological clipboard where, anyone could ascertain whether or not they had all the documents generated to that present time.

SUPPORT MECHANISMS FOR GAME

There is a need to incorporate an automatic system to perform such functions as tracking, updating, reporting, announcements, and feedback. The system should be designed to run in the background and provide support as opposed to being in the foreground which could easily create an impediment to the creativity and potential "richness" of the Game. Such a system would be able to catch errors such as activities and deals between various teams resulting in the combined market share of various teams exceeding the stated market for the product (SAMSON) at any given point in time. At the end of the Game, it appeared that the combined market share of the teams exceeded the stated market that existed, i.e., 250%. During the Game a similar problem seemed to exist.

Additionally, a computer with spread sheet and a computer operator, well versed in the spread sheet program, for use by team members would greatly enhance the ability of the players to interact in generating the Game's intended results. The generation of financial statements such as balance sheets, profit and loss statements, and cash flow statements require an inappropriate amount of time with respect to the Game duration. This problem is exacerbated when the many changes that occur during the Game necessitate the recalculation of these financial statements.

A copy machine, located for easy access by all team members, would further facilitate the Game's evolution and conclusion.

GAME TEAM INTERRELATIONSHIPS

The design structure of the Game, (specifically, the various teams, i.e., government, university, corporate, financial, and control) is excellent. This enables interactions that simulate the real world in a meaningful manner. However, the financial and control (Green) teams' decisions have immense impact (leverage) on the interactions of the Game and thus can easily divert the Game into an area that is not in keeping with the reality of the outside world. The delicate balance between maintaining an open creative "space" and one of over-control is difficult to ascertain.

Balance could be enhanced by personnel selection for the financial and control (Green) teams. This means that the financial team should have team members who have expertise in international finance, government finance, investment banking, and corporate finance which was severely lacking in the Finance Team.

The Green team should have people in the team who are described as generalists, that is people who have an extremely broad backgrounds, in areas such as technology, executive corporate skills, finance, operations, entrepreneurship, creative and innovative concepts, gaming, deal making, international affairs, and process skills. Granted, such people are difficult to locate, yet, they do exist, and the effort would vastly enrich the Game results.

TOOLKIT

If one of the objectives of the Game was to ascertain the relative interest in the Toolkit, the Game could provide a cursory indication. If one of the objectives was to ascertain the merit of any one given item, via voting (purchase amount allocation by each team), then the results could be very misleading for various reasons stated as follows:

The team members (Horioka) did not understand the Toolkit very well, as to the working mechanics, and the value that could be received by allocating resources to a particular item.

Even when the team members (Horioka) did have an understanding, after the vote was transacted, they believed that other teams would vote for the item and that their team would receive the benefit of its activation, without the necessity of using any of the Horioka's assets.

The team members (Horioka) were more concerned with the areas directly under their control than the possibility of an external item being of assistance to their Game objectives.

Hence, it could be concluded that the results of voting (via asset allocation) did not provide a valid measurement of the players' opinion about a specific item contained within the Toolkit, i.e. If they were polled individually about the merit of any given item, outside the context of the Game, their opinion could be very different. In summary, as a result of the foregoing, the results of the Toolkit voting could reflect little on the real merits of the Toolkit provisions.

Balance Sheets and P/L Statements

HORIOKA LTD.

ASSETS	Year ending December 31 (in thousands, except par value amounts)		
	1994	1993	1992
CURRENT ASSETS			
Cash and Cash equivalents	4,326,450	3,914,719	3,557,536
Trade accounts receivable (net)	1,802,955	1,783,956	1,408,569
Inventories	2,125,689	2,558,985	2,039,550
TOTAL CURRENT ASSETS	8,255,094	8,257,660	7,005,655
PROPERTY, PLANT, AND EQUIPMENT			
Land	15,000,000	15,000,000	15,000,000
Buildings	27,370,920	24,017,400	23,997,330
Machinery and equipment	47,394,000	50,706,570	50,634,000
Less: Accumulated depreciation	12,331,971	12,300,000	12,285,000
	77,432,949	77,423,970	77,346,330
OTHER ASSETS	4,074,000	5,660,331	4,968,150
TOTAL ASSETS	$89,762,043	$91,341,961	$89,320,135
LIABILITIES AND STOCKHOLDERS EQUITY			
CURRENT LIABILITIES			
Accounts payable	2,905,722	3,017,460	2,415,018
Accrued liabilities	2,556,000	2,389,500	2,401,974
Current portion of long-term debt	6,000,000	5,956,866	5,368,500
TOTAL CURRENT LIABILITIES	11,461,722	11,363,826	10,185,492
LONG-TERM DEBT	45,000,000	51,000,000	54,000,000
TOTAL LIABILITIES	56,461,722	62,363,826	64,185,492
STOCKHOLDERS' EQUITY			
Common stock, $.01 par value, 2,000,000,000 shares authorized, 720,000,000 shares, 615,250,000 shares, and 595,000,000 shares issued and outstanding	72,000	61,525	59,500
Additional paid-in-capital	630,000	378,000	300,000
Retained earnings	32,598,321	28,538,610	24,775,143
TOTAL STOCKHOLDERS' EQUITY	33,300,321	28,978,135	25,134,643
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	$89,762,043	$91,341,961	$89,320,135

HORIOKA LTD.

	Year ending December 31 (in thousands)		
	1994	1993	1992
NET SALES	$10,635,090	$9,306,000	$7,725,000
Cost of products sold	3,903,078	350,160	2,696,025
GROSS PROFIT	6,732,012	8,955,840	5,028,975
Operating Expenses:			
Selling, general and administrative	1,261,140	1,108,212	863,940
Product development	634,800	495,000	370,962
	1,895,940	1,603,212	1,234,902
INCOME (LOSS) FROM OPERATIONS	4,836,072	7,352,628	3,794,073
Interest expense (income)	4,305,000	5,094,900	5,106,000
Other income	797,400	1,496,160	695,715
INCOME (LOSS) BEFORE INCOME TAXES	1,328,472	3,753,888	(616,212)
Income taxes	677,520	384,483	(314,268)
NET INCOME (LOSS)	$650,952	$3,369,405	($301,944)

HORIOKA LTD.

ASSETS

Future (in thousands)

	1999 All Product Lines	1999 Samson Only	1995 All Product Lines	1995 Samson Only	1994
CURRENT ASSETS					
Cash and Cash equivalents					4,326,450
Trade accounts receivable (net)					1,802,955
Inventories					2,125,689
TOTAL CURRENT ASSETS	15,000,000		9,500,000	0	8,255,094
PROPERTY, PLANT, AND EQUIPMENT					
Land	15,000,000	0	15,000,000		15,000,000
Buildings	36,000,000	1,000,000	27,000,000	0	27,370,920
Machinery and equipment	67,000,000	2,000,000	48,000,000	0	47,394,000
Less: Accumulated depreciation	17,000,000	500,000	12,000,000	0	12,331,971
	101,000,000	2,500,000	78,000,000	0	77,432,949
OTHER ASSETS	6,000,000	500,000	4,000,000	0	4,074,000
TOTAL ASSETS	$122,000,000	$3,000,000	$91,500,000	$0	$89,762,043
LIABILITIES AND STOCKHOLDERS EQUITY					
CURRENT LIABILITIES					
Accounts payable	6,000,000				2,905,722
Accrued liabilities	5,000,000				2,556,000
Current portion of long-term debt	7,000,000				6,000,000
TOTAL CURRENT LIABILITIES	18,000,000		13,000,000		11,461,722
LONG-TERM DEBT	50,000,000	0	45,000,000		45,000,000
TOTAL LIABILITIES	68,000,000		58,000,000		56,461,722
STOCKHOLDERS' EQUITY					72,000
Additional paid-in-capital					630,000
Retained earnings					32,598,321
TOTAL STOCKHOLDERS' EQUITY	39,000,000		33,500,000		33,300,321
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	$107,000,000		$91,500,000		$89,762,043

HORIOKA LTD.

	1999	Samson	Future (in thousands) 1995	Samson	1994
NET SALES	$21,990,000	720,000	$12,656,000	320,000	$10,635,090
Cost of products sold	8,200,000	400,000	4,746,000	210,000	3,903,078
GROSS PROFIT	13,790,000	320,000	7,910,000	110,000	6,732,012
Operating Expenses:					
Selling, general and administrative	2,590,000	90,000	1,514,000	64,000	1,261,140
Product development	1,345,000	45,000	882,000	153,000	634,800
	3,935,000	135,000	2,396,000	217,000	1,895,940
INCOME (LOSS) FROM OPERATIONS	9,855,000	185,000	5,514,000	(107,000)	4,836,072
Interest expense (income)	5,040,000	40,000	4,965,000	15,000	4,305,000
Other Income					797,400
INCOME (LOSS) BEFORE INCOME TAXES	4,815,000	145,000	549,000	(122,000)	1,328,472
Income taxes	2,408,000	73,000	274,000	(61,000)	677,520
NET INCOME (LOSS)	$2,407,000	$72,000	$275,000	($61,000)	$650,952

Schmidt GmbH.: European Computer and Electronics Manufacturer

PREGAME SCENARIO

Company structure, assets, and context for decisions

You are a European supplier/manufacturer of consumer electronics such as computers, automotive electronics and medical electronics. You supply consumer electronics in Europe and supply much of the automotive electronics to Germany and France.

Your Lyon R&D center has been developing a new, high performance, rechargeable battery technology which could give a significant sales advantage when used in a SAMSON-like device. This battery technology improves energy density by 40% but would increase the price of SAMSON by $100. The goal of SAMSON is 8 hours of operation on a single charge. This can be met by using conventional batteries and a low-power chip set. However, 12 hours of operation could be achieved combining your battery and the low-power chip sets.

You are seeking a cooperative agreement with either Infomatics or Horioka on the development and manufacture of the SAMSON product. Your company has sales of about $3B annually, however your PC factory in Hamburg is operating in the red. You have much pressure to either show a profit in your PC line or close it down. Your Frankfurt sales center has been encouraging you to drop your PC line and distribute products from Infomatics and Horioka and has negotiated with Infomatics and Horioka about importing PC's and laptops into Europe. Your leadership in consumer electronics sales in Europe has you strategically positioned to introduce SAMSON into Europe.

You have a $1.5M ESPRIT contract (cost shared) to develop advanced bio-sensors which could add additional capability to the SAMSON device for medical applications, sports applications, and for the disabled.

You have 7 other major manufacturing and R&D centers associated with the SAMSON effort.

1) Eindhoven - Consumer Electronics assembly.
   Europe's most advanced consumer electronics assembly plant. Highly automated with Horioka robotics. This plant generates $500M of sales per year, borrows money at 10% annual interest, uses 121 robots initially costing $300K each, and employs 805 people at labor costs of $12 per hour for a "labor" (people plus debt retirement on automation) annual cost of $59M. The plant produces $10 of sales per dollar "labor" cost.
2) Hamburg - Computer Assembly
   Partially automated assembly plant for PC's and laptops. Utilizes a mix of Horioka and Mechatronics automation equipment. Currently this plant is operating in the red. Major automation will be required to reduce labor costs (an investment of $50M). You must work a deal with labor unions to fully automate. About 90% of the PC's sold utilize OSPC under license from Infomatics. (This license is good for an additional 4 years but does not cover new products like SAMSON.) The other 10% utilize custom operating systems, one for banking and the other for government. You have a 4-year contract to supply these specialty units to the German Government.

Since the plant is operating well below capacity, it is ideally suited for SAMSON production. This plant generates $500M of sales per year, borrows money at 10% annual interest, uses 43 robots initially costing $300K each, and employs 1433 people at labor costs of $12 per hour for a "labor" (people plus debt retirement on automation) annual cost of $92M. The plant produces $5.4 of sales per dollar "labor" cost.

3) Lyon - Battery & storage R&D center
The center develops advanced batteries and has a new battery technology which will dramatically improve portable electronics performance. The technology produces 25% more power per weight than the competition. The technology is still 3 years away from production, and will require an additional $50M per year to reach production. (Probability of success in 3 years is 60%). The center operates on an annual budget of $80M.

4) Stuttgart - IC development and manufacture.
This facility has jointly developed the low-power CPU technology with Horioka. This plant generates $370M of sales per year, borrows money at 10% annual interest, uses 64 robots initially costing $300K each, and employs 639 people at labor costs of $12 per hour for a "labor" (people plus debt retirement on automation) annual cost of $48M. The plant produces $8.4 of sales per dollar "labor" cost.

5) Frankfurt - Sales and distribution center.
Your Frankfurt operation has been negotiating with Infomatics and Horioka about importing PC's and laptops into Europe.

6) Vienna - Bio-sensor and medical electronics R&D.
Austria's recent entry into the EC has allowed ESPRIT funding of this activity. Vienna is interested in the medical applications of SAMSON for training, and patient care. The R&D center operates on an annual budget of $75M.

7) Munich - Automotive Electronics
Your Munich group is very interested in the automotive applications of SAMSON. They have been working with Viewall on automotive applications for 3-D displays. This plant generates $1.2B of sales per year, borrows money at 10% annual interest, uses 206 robots initially costing $300K each, and employs 2069 people at labor costs of $12 per hour for a "labor" (people plus debt retirement on automation) annual cost of $43M. The plant produces $8 of sales per dollar "labor" cost.

Specific Issues to be resolved for SAMSON

You have much interest in SAMSON products. Your automotive group in Munich is extremely interested in the applications for automotive electronics. You would like to license or develop the technology internally. Your non-conventional applications for SAMSON gives you the possibility of non-competing markets.

Key challenges are:

1) Advanced automated assembly and packaging
2) Better display technology
3) Better software

4) Lower Power Operation
5) Location of Production

Decision I: Automated Assembly and Packaging

To reduce weight and cost of the device, stacked circuits on advanced diamond substrates will be required along with sophisticated assembly and testing. No one can currently produce the automated packaging, assembly and test equipment needed for the commercial version of SAMSON. Horioka has a major effort in CAD/CAM assembly/testing and plans to have the necessary equipment available in 4 years. Since Horioka is one of your direct competitors, you may have to offer some technology in return for receiving advanced robotics. Mechatronics has also been developing the necessary automation/test equipment under their own funds and with SEMATECH and ARPA contracts. However, their long-term viability is in question. New Mechatronics tools have been evaluated by SEMATECH as best in the field, but Mechatronics has had great difficulty in getting many sales due to their unstable financial situation.

Option I-A: Negotiate a supply from Horioka.

> They are your direct competitors. Horioka has traditionally sold their automation equipment openly, but you have fears about depending on key tooling from your competitors.
>
> They have expressed interest in jointly funding the development of automation equipment with Infomatics, and are suggesting a $30M (each) per year development program. You may wish to participate.

Option I-B: Negotiate a supply from Mechatronics.

> Mechatronics was once a world leader in robotics equipment, but has been losing market share steadily for the past 10 years. Presently they have about 7% of the semiconductor market share and are in a shaky financial situation. They will require a minimum of $200M of investment capital to remain viable, and an additional $50M per year for the next 3 years to develop the necessary equipment for SAMSON. Recent tools for advanced diamond packaging, developed with help from SEMATECH, have been determined as best in the field by SEMATECH, but as yet Mechatronics has received few orders.
>
> Risks are very high that Mechatronics will go out of business, jeopardizing your ability to produce SAMSON should you decide to go with Mechatronics. For Mechatronics to be viable, they need financial assistance.

Option I-C: Negotiate a supply from both Horioka and Mechatronics.

Option I-D: Encourage/promote EC funding advanced automation/robotics.

Decision II: Displays

In the military version of SAMSON, developed by Infomatics, the B&W 3-D display is the single largest power consuming device, and adds about 5 lbs. to the device weight. Infomatics, as well as Viewall, have been working on a color 3-D display that would cut the power consumption in half, and the display weight to 2 lbs. The display used by Infomatics in the military product is purchased from Viewall. Infomatics has

an important patent on a non-linear optical element needed for color 3-D technology, but Viewall has an important patent on quantum-coupled laser diodes, used in the B&W displays and directly applicable to the color displays. Eurolaser has been developing 3-D laser array technology which, if feasible, could substantially improve performance without the need for the expensive non-linear optical elements or quantum-coupled laser technology.

Viewall and others are working to reduce power consumption and weight. Your work in developing low-power electronics as well as high-performance batteries gives you a strong position in portable electronics. You have begun discussions with Eurolaser about teaming to produce your own 3-D displays. Continual early access to new 3-D display technology would allow you the advantage of concurrently engineering improvements into future SAMSON versions.

Option II-A: Negotiate a favored treatment with Viewall.

Option II-B: Negotiate with Viewall to provide early access for concurrent engineering by all three suppliers.

Option II-C: Produce in-house version.

Option II-D: Develop intellectual property asset through funding of Eurolaser

Option II-E: Develop strategy for exploiting potential breakthrough in lasers for 3-D displays.

Option II-F: Develop, co-develop or negotiate with Viewall to develop special 3-D displays for medical or automotive applications for SAMSON.

Decision III: Software

You must decide on the operating system for SAMSON. The present operating system for your PC's is OSPC, a proprietary OS licensed from Infomatics. This operating system is the world's old standard for laptop and portable PC personal communicators. Unfortunately, the OSPC is 10 years old, and limits performance of SAMSON. You have tried unsuccessfully in the past to introduce a new operating system, but the large base of OSPC users has limited the interest in the new operating system.

Both Infomatics and Horioka have explored new operating systems. Your automotive and medical applications do not fit well within the OSPC environment, and may require a custom operating system. You have become interested in a software product by Rootska, which is a user-adaptable AI operating system which would easily handle your automotive and medical electronics needs.

Option III-A: Negotiate a continued license with Infomatics.

Option III-B: Develop European or European/Japanese operating system.

Option III-C: Examine the Rootska product.

Option III-D: Develop a custom OS for medical and automotive applications.

Option III-E: Buy or capitalize Rootska.

Decision IV: Low Power Operation

The goal for SAMSON is 8 hours of operation on a rechargeable battery. This will require the new display technology plus either a new ultra-low power chip set or new battery technology. Possible options are:

You and Horioka have jointly developed an ultra-low power chip set applicable to SAMSON. This chip set is NOT instruction-set compatible with the Infomatics slow-power chip set and is not OSPC compatible.

Your new battery technology would increase power output by 40% for the same weight of a conventional battery. The new battery would add about $100 to the cost of each unit.

The use of either the new battery or the low-power chip set would meet the 8-hour performance goal. The combination of both would allow 12 hours of use.

Option IV-A: License or purchase the low-power chip set being developed by Infomatics.

Option IV-B: Use your own low-power chip set.

If you elect to use the OSPC operating system, you will be forced to use the Infomatics chip set. If you use your own or another operating system, you can use any chip set.

Option IV-C: Use your new battery technology

The new battery technology would add about $100 to the cost of each unit.

The use of either the new battery or the low-power chip set would meet the 8-hour performance goal. The combination of both would allow 12 hours of use.

Option IV-D: Develop a market for Schmidt low-power CPU
Negotiate an exclusive supply with Infomatics
Negotiate an exclusive supply with Horioka
Negotiate a non-exclusive supply with Horioka and Infomatics
Keep low-power CPU technology exclusively for Schmidt SAMSONs
Use SAMSON only for automotive or medical applications where low power is less important

Decision V: Manufacturing

You should decide if and where to produce SAMSON.

Option V-A: Upgrade one of your existing plants.

Option V-B: Build a new plant.

Option V-C: Negotiate joint development/production with Infomatics or Horioka.

Option V-D: Use SAMSON from Infomatics or Horioka as a platform to be modified by you for resale to the medical or automotive industry.

Other Opportunities

Examine the Technology and Policy Toolkit for Initiatives for your team to push.

RESOURCES AVAILABLE:

Your team initially has $1.3B to spend on making deals and investing in Toolkit Options. Additional funds, if needed, must be raised through borrowing from the Green Finance Team or receiving funds from other teams.

The current price of your stock is $9.75 per share, with 283.422,125 shares outstanding.

SCHMIDT GAME PLAY

Strategy

I. Become the exclusive manufacturer and supplier of Samson in Europe.
II. Investigate several Samson partners and possible niche markets.
    A. Automotive applications.
    B. Medical applications.
III. Leverage investment in technological advances.
    A. Batteries (Schmidt)
    B. Low power chip sets (Schmidt & Horioka)
    C. Sensors (Schmidt).
IV. Cement relationships with European suppliers.
    A. Eurolaser.
    B. EU Governments.
    C. Rootska.
V. Software and operating system.
    A. Maintain an open system utilizing Schmidt and/or Rootska technology.
        1. Share if necessary.
        2. License for Infomatics if necessary.
    B. Operating system.
    C. VR, 6 PS, Ext.
VI. Use technology beyond Samson.

Summit Topics

Not Given.

First Day Agreements

9/8/94 Time unknown

EU Government, Schmidt, Eurolaser

The parties agree to form a consortium to develop Samson technology. The consortium shall be industry led and Government facilitated.

9/8/94 12:52 PM

Schmidt, Eurolaser

Schmidt makes an offer to purchase Eurolaser for $15M (premium of approximately 50% over market value) for 100% of the company. (EU M&A board will not block).

First Round of Toolkit Investments and Outcomes

Successful Investments ($M)

Investment	Amount Invested	Partners / *other investors*
Robotic Controllers for precision Alignment	35	EU Gov't. *Info, Mech, US Gov't*
Simulation tools integrated into system that reduces design time from 15 to 4 months	70	EU Gov't *Info, View, US Gov't*
Inference engine for AI software allows adaptive learning in computer-driven devices.	25	EU Gov't
High-resolution, 3-D FPD's become available for $150.00 each	70	EU Gov't
Improved feeding of thin laminated substrates improves yield by 30%	0	EU Gov't
Total successful investments	**200**	

- Investments by Schmidt and the EU Government in inference engines gave Schmidt exclusive rights to this technology. This diminished Schmidt's need for Rootska technology and gave them added bargaining power and increased market share.
- The combined Schmidt and EU investment in robotic controllers allows Schmidt to begin production of their own robotics.

Unsuccessful Investments ($M)

Investment	Amount Invested	Partners
Intelligent software increases worker productivity by 6%	50	EU Gov't
Total unsuccessful investments	**50**	

First Day End Briefing

- Schmidt will be the exclusive manufacturer and supplier of Samson in Europe.
- Schmidt attempting to enter non-European markets.
- Schmidt is looking for partners in Samson applications including automotive and medical applications.
- Schmidt has created its own robot factory.
- All components of Samson have been identified except the operating system.

Notes on Schmidt's attempted hostile take-over of Eurolaser.

At 12:52 PM Schmidt presented the Green team with an offer to purchase 100% of Eurolaser at 50% over market value. The Green team authorized the purchase assuming that the EU Governments had approved of the purchase. Eurolaser strongly objected and filed a suit against Schmidt (See Eurolaser write-up.). The Green team court decided in favor of Eurolaser citing that EU Borse laws require notice and approval of purchases greater than 5% of any company. Schmidt could not prove they had approval by the EU government for such action.

Second Day Agreements (After Rootska Announcement)

9/9/94 8:35 AM

Schmidt, Universities

Based on extensive University research in neural networks Schmidt has agreed to fund a $30M effort at the University to develop a neural net based real time process control system for use in Schmidt's new automated manufacturing facility for Samson production to improve manufacturing quality and flexibility.

9/9/94 8:36 AM

EU Government, Schmidt

The EU transfers the following Toolkit investments to Schmidt as part of the consortium:

- Robotic Controllers
- Failure rate of PCMCIA's
- Rapid Prototyping
- Inference Engine
- Substrates/ Improved feeding of thin film laminates (50% position)

9/9/94 9:27 AM

Eurolaser, Schmidt

In exchange for market share of Schmidt displays, Eurolaser agrees to grant Schmidt preferential treatment with the delivery of all displays regardless of use. This agreement stands for a period of 3 years.

9/9/94 9:45:00 AM

Schmidt, Mechatronics

Mechatronics shall supply Schmidt with production equipment for non-Samson type product applications, in particular automotive applications. This will include an upgrade of the Munich plant (1996) and the construction of a new plant in Mexico (1997). Price of a turn-key installation will be $200M. Costs of the Munich plant upgrade will be negotiated as a function of the requirements.

9/9/94 10:45 AM

Schmidt, Rootska

Schmidt and Rootska will collaborate on the joint development of applications and operating systems for:

1) Worldwide automobile market including a new plant in Mexico.
2) New markets as identified and mutually agreed upon.

Royalties will be paid to Rootska by Schmidt partnered with Horioka.

9/9/94 10:45 AM

Schmidt, Horioka

I. Horioka agrees to exchange its low cost battery production technology for Schmidt's agreement to share Schmidt battery technology.

II. Horioka will sell and support Schmidt electronic assembly equipment on a preferential basis (including upgrades).

III. Horioka will cooperate with Schmidt for development of an open architecture standard and software for a 3-D Samson. (Possibly including emerging alliances.)

IV. Horioka will cooperate with Schmidt to jointly develop an ultra-low power chip set to exploit Schmidt's low-cost, long-lived battery technology.

V. Horioka will cooperate on the development of Samson integrated products in Japan with major participation by a Schmidt team. Including:

   A. Set-up of a transfer team to move production volume to Schmidt's Hamburg plant.

   B. Product to be branded for either Horioka or Schmidt as required by market penetration.

   C. If production volume exceeds certain rate, Horioka can make any excess volume in Japan as agreed to by Schmidt and Horioka.

   D. Schmidt will distribute in Europe exclusively and Horioka will distribute exclusively in the far east. (One year after introduction, Schmidt shall make Horioka branded product for Horioka for sale in Europe. Horioka agrees for 5 years to sell only Schmidt produced product in Europe, with reciprocal agreements in the far east. If capacity is limited, parties will mutually agree on added factories locations).

   E. For technological advances and new developments the parties agree to grant each other cross licensing rights.

9/9/94 10:45 AM

Schmidt, Rootska

The parties agree to collaborate in the joint development of applications and operating system software for:

1) Worldwide automobile market including the new plant in Mexico
2) New markets as identified and agreed upon
3) Royalties will be paid to Rootska by Schmidt partnered with Horioka

9/9/94 11:45 AM

Schmidt, Mechatronics

Schmidt makes available to Mechatronics the inference engine on a non-exclusive basis free of charge and Mechatronics upgrades the two contracted projects (upgrade of the Munich plant, and the new plant in Mexico) free of charge.

9/9/94 12:55:00 PM

Schmidt, Infomatics

Schmidt shall make available its battery and sensor technology. In return Infomatics shall make available to Schmidt the Mastermind operating environment. The parties will be prepared to consider joint development of operating system software.

Final Round of Toolkit Investments and Outcomes

None

Final Briefings

I. Schmidt was the smallest Samson OEM, but strong in automotives.
II. Schmidt was committed to stay in the Samson market but needed collaborative agreements.
III. Investigated other applications for Samson such as automotive, medical, robotic and air traffic control applications.
IV. Strengthened their technology position on a good technology base.
V. Concluded agreements for the missing pieces needed to produce Samson.
    A. Obtained a software agreement with Infomatics for Mastermind.
    B. Obtained an agreement with Horioka greatly assisting Schmidt in producing Samson. The agreement was leveraged on Schmidt's battery and laminate substrate technology.
    C. Obtained an agreement with Eurolaser for displays.
    D. Participating in a Consortium with Eurolaser.
VI. Leveraged Schmidt's good distribution network through Europe and the opening of Eastern Europe.
VII. Viewed the Eastern Europe market as expanding fast, especially in electronics and automotives.
VIII. The automotive applications seen to outpace Samson sales for entertainment and communication.
IX. Managed to build on existing position in the world wide automotive market.
    A. Obtained an agreement with Mechatronics on robotics for automotive applications.
    B. Built an automotive plant in Mexico.
    C. Upgraded Munich automotive plant.
X. Obtained Rootska technology through a sub-license to Infomatics.

Midday Analyst's Report Highlights

I. Strategic objective originally regional, grew to a global company.
II. Automotive spin-off - Business into Mexico.
III. Facilitator had difficulty maintaining control.
    A. Owned but did not control.
IV. Some fraction of the group was disenfranchised.
V. Innovators not generally used.
VI. Excessive EC Govt. influence derailed Schmidt.
VII. Before they could get their act together were knee-deep in alligators.
VIII. Deals made at the end were possibly counter productive.

ANALYST'S REPORT

Observations pertaining to the content of this game

1. The members of the Schmidt team initially developed a strategy based on their view of their organization as a strong European marketer of Samson-type products. Their strategy was built primarily around protecting that position. However, as the game progressed their view of themselves changed; they began to see themselves from a more global perspective. As they did so, their strategy was modified (although not formally) as they became players on the global scale. They even projected themselves outside the defined game, i.e., beyond electronic systems development and marketing to identifying their need to impact the world automotive market. They did this by directing some of their available resources to building a plant in Mexico. This plant was to be a copy of one of their existing facilities, simply extending their market for their existing products (pre-Samson technology). My point here is that, in my view, during the course of the game as a result of the eventualities of the game, the team moved toward a much more global view of themselves as a company than they initially defined.

2. This comment may be regarded as related to both content and structure. Business activities might be thought of as being in two categories: 1) Thinking, analyzing, planning, studying and 2) doing (making the deals). In this game, it seemed to me that the Schmidt team was overwhelmed by the second type of activity to the extent that they were unable to give enough time/effort to the first type. Examples: a) Schmidt was approached about participating in the European consortium and pressed for commitment before they had the opportunity to assess the situation to see that this was potentially beneficial for them as a company. b) Schmidt's deal with Rootska near the end was not well defined, and I believe that Schmidt did not get what they thought they were getting simply because there was not enough time given to defining the "deal." c) Schmidt never really considered the outcome of their results from the tool kit investments (a particularly successful exercise for Schmidt which they didn't use effectively). Perhaps, this being "overwhelmed" was part of the game, but I felt that it was so severe as to be non- representative of the real world. Specifically, I felt that deals were being made in which the values of the bargaining chips were not at all well established. Quote (M. Oppenheimer): “We don't have time to assimilate all this.” Thus, I would suggest structural changes to help this situation. Suggestions: a) Schmidt had only two players and a part-timer, and one of them had not had the opportunity to do adequate preparation. More players were needed. b) The game time could be divided into periods given to more contemplative activity and periods open for deal-making. Allowing dealing at any and all times led to situations I would describe as "frantic," particularly for a small, ill-prepared team like Schmidt. However, it also became clear that some players performed better than others in that frantic environment.

3. The backgrounds of the players were important to the content of the game. The two Schmidt players were very knowledgeable in the area of international commerce and they used that knowledge in their play. Although the game was, as best I could judge, reasonably well-defined, there was much about the environment of international commerce that was not defined but that could impact the game. The players seemed very capable of filling in the gaps. Examples: Cultural differences among European, Japanese, and American interests, movement of substantial automotive industry to Mexico, Japanese interest in Pacific rim markets, everyone's interest in the Chinese markets, etc.

4. In the dynamics of forming the European Consortium, it became obvious that the European Government team was driven by forming the Consortium and their constituents achieving some level of market dominance, i.e., power. The EuGov team never seemed to give their constituents time to assess

the bottom line for their particular companies, nor did EuGov ask them how EuGov could help to establish conditions for a favorable bottom line. Quote (Michael Parks, EuGov): We need to act in a coherent and preemptive way. Response (Michael Oppenheimer, Schmidt): We need to do our homework. For the EuGov team, market power/control, not profit for the companies, was the objective. Counterpoint: The EuGov team was very supportive in making tool kit investments to support the stated needs of Schmidt.

5. I felt that EuGov exerted somewhat too much influence over Schmidt, due largely to a single individual, Michael Marks, on the EuGov team. The influence of dominant individuals, however, would be encountered in real life. The compression of time, and the concomitant limited time to study/evaluate actions, exaggerated this phenomenon in comparison to real situations.

6. In my opinion, the teams presented themselves in the final session as having been much more systematic in developing their strategy and carrying it out than was actually the case. The presentations profited a great deal from "20/20 hindsight." This opinion is based on the obvious differences between the analysts reports in our meeting and the team reports shortly thereafter. To some degree, this apparent difference may be due to the players' comfort in dealing with strategies not completely formulated (at least not adequately documented). Most of the analysts have engineering backgrounds and may tend toward more precision and completeness, i.e., we like "well posed" problems.

7. Someone reporting from the Viewall team described the alliances as "stable." I would disagree with that assessment. My judgment is that in real situations, much more time would have been given to evaluation before the deals were consummated, and, therefore, I would guess that the alliances made in the game were considerably more numerous than would have been the case in a real situation and that they would<u>not</u> be stable. I believe that they would come apart due to eventualities that were not considered in the time available.

8. Someone referred to turning "technology into revenues." It should be noted that advanced technology (i.e., superior product) has the potential for riches, but it certainly is not assured. Also, marketing alone cannot produce success, it needs a marketable product. I think American entrepreneurship has demonstrated a) that success comes from the combination of a good product, a good marketing strategy, and effective business practices and b) that most often these components come from different minds. Example: The concept and some personal computer products were around for some time before IBM initiated a marketing approach that has put PCs on most desks. Furthermore, since then, many companies, e.g., Gateway and Del, have made huge profits in the PC business with virtually no technological advantage.

9. The fuel for the Prosperity Game's engine is $$. It seemed to me that everyone had plenty of money to do everything they wanted to do. It did not seem realistic. Was there too much capital, i.e., non representative amounts, available in this game? Schmidt was "successful" with no outside sources for investment capital.

<u>Observations pertaining to the game structu</u>~~r~~e

1. See #2 above.

2. Per pregame discussion, there was, especially at first, a very strong tendency among the players to attack the "rules of the game" when things turned against them. Example: When Schmidt tried to buy Eurolaser, Eurolaser cried, "Foul," based on challenge to the rules. When the buyout was disallowed, Schmidt cried, "Foul," but less loudly. The Green Team's often-used response, "Deal with it!," was very effective. In general, however, I was surprised how quickly and completely the players assumed their roles.

3. Kathleen Robertson joined the team Thursday morning and left early on Friday. Although she is most capable and an experienced game player, part-time participation significantly compromises the game, especially on a small team.

4. One result of the "open season" on dealing was that the facilitators found it very difficult to channel the activity.

5. In my opinion, the Rootska perturbation came too late in the game. I understand that the intent was to drop a bombshell, but it seemed to me that it started a frenzy which continued throughout the remaining time, creating many issues which were not resolved.

6. Especially toward the end, I thought that our team was making deals that might have been incompatible, e.g., conflicting "exclusive" agreements. Is there any mechanism other than the Green Team's near term memory to ensure appropriate agreements?

Overall evaluations

1. Team members--All made substantial contribution to the team. Franz Krejs, with his experience and understanding in European commerce, was particularly important to the Schmidt team. The team could have profited from additional technical expertise and just more manpower.

2. Staff--I felt that we (the staff assigned to the Schmidt team) supported the team well without becoming too active in team activities. In some respects we were "safety officers on the Titanic," i.e., the process was much more than we could control. I feel that the learning curve is steep; at least, I feel that I could perform my role much better after the experience of doing it once. Perhaps a meeting with the staff before we left for the game would have been helpful.

3. I noted a characteristic in the play of Kathleen Robertson. She was much less "frantic" because she was obviously playing a game. (I believe that she has had a great deal of similar experience.) This observation led to a question: Do people in a game act significantly differently from what they would do in real situations? Illustration: When I first played Monopoly, I played with my natural conservatism. But I learned that the rules and probabilities of the game favored a substantially more aggressive style of play. To win the game, I became aggressive. However, in real situations (e.g., personal investments, career decisions, etc.) I remain conservative. I'm sure that the degree to which each player would be affected is a matter of personal style and familiarity with the game. Is this an issue to be considered in evaluating a game? Analogy: Do "generals" in war games do things they wouldn't do for real because the troops aren't really at risk?

Balance Sheets and P/L Statements

SCHMIDT GmbH

ASSETS	Year ending December 31 (in thousands, except par value amounts)		
	1994	1993	1992
CURRENT ASSETS			
Cash and Cash equivalents	658,691	156,682	176,797
Trade accounts receivable (net)	254,824	248,570	232,776
Inventories	384,356	371,954	343,758
TOTAL CURRENT ASSETS	1,297,871	777,206	753,331
PROPERTY, PLANT, AND EQUIPMENT			
Land	79,500	79,500	79,500
Buildings	428,982	419,124	354,570
Machinery and equipment	165,254	197,054	151,792
Less: Accumulated depreciation	84,164	66,250	60,102
	589,572	629,428	525,760
OTHER ASSETS	85,330	131,228	45,474
TOTAL ASSETS	$1,972,773	$1,537,862	$1,324,565
LIABILITIES AND STOCKHOLDERS EQUITY			
CURRENT LIABILITIES			
Accounts payable	145,008	162,604	168,222
Accrued liabilities	95,400	90,100	92,750
Current portion of long-term debt	161,862	175,748	169,600
TOTAL CURRENT LIABILITIES	402,270	428,452	430,572
LONG-TERM DEBT	765,214	766,910	780,902
TOTAL LIABILITIES	1,167,484	1,195,362	1,211,474
STOCKHOLDERS' EQUITY			
Common stock, $.01 par value, 1,000,000,000 shares authorized, 283,422,125 shares, 234,572,799 shares, and 221,539,107 shares issued and outstanding	2,834	2,346	2,215
Additional paid-in-capital	3,199,292	2,921,360	2,340,480
Retained earnings	(2,396,837)	(2,581,206)	(2,229,604)
TOTAL STOCKHOLDERS' EQUITY	805,289	342,500	113,091
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	$1,972,773	$1,537,862	$1,324,565

SCHMIDT GmbH

	Year ending December 31 (in thousands)		
	1994	1993	1992
NET SALES	$3,092,868	$2,304,016	$3,043,472
Cost of products sold	1,088,046	853,194	1,206,280
GROSS PROFIT	2,004,822	1,450,822	1,837,192
Operating Expenses:			
Selling, general and administrative	1,107,064	1,577,916	1,829,772
Product development	498,200	413,400	212,000
	1,605,264	1,991,316	2,041,772
INCOME (LOSS) FROM OPERATIONS	399,558	(540,494)	(204,580)
Interest expense (income)	64,342	76,638	7,738
Other income	0	0	0
INCOME (LOSS) BEFORE INCOME TAXES	335,216	(617,132)	(212,318)
Income taxes	150,847	0	0
NET INCOME (LOSS)	$184,369	($617,132)	($212,318)

SCHMIDT
GmbH

ASSETS

	1999 All Product Lines	1999 Samson Only	Future 1995 All Product Lines	Future 1995 Samson Only	1994
			(in thousands)		
CURRENT ASSETS					
Cash and Cash equivalents					658,691
Trade accounts receivable (net)					254,824
Inventories					384,356
TOTAL CURRENT ASSETS			1,260,000	0	1,297,871
PROPERTY, PLANT, AND EQUIPMENT					
Land			80,000		79,500
Buildings			430,000	0	428,982
Machinery and equipment			360,000	0	165,254
Less: Accumulated depreciation			105,000	0	84,164
			765,000	0	589,572
OTHER ASSETS			210,000	0	85,330
TOTAL ASSETS			$2,235,000	$0	$1,972,773
LIABILITIES AND STOCKHOLDERS EQUITY					
CURRENT LIABILITIES					
Accounts payable			150,000		145,008
Accrued liabilities			48,000		95,400
Current portion of long-term debt			140,000		161,862
TOTAL CURRENT LIABILITIES			338,000		402,270
LONG-TERM DEBT			605,000		765,214
TOTAL LIABILITIES			943,000		1,167,484
STOCKHOLDERS' EQUITY					2,834
Additional paid-in-capital					3,199,292
Retained earnings					(2,396,837)
TOTAL STOCKHOLDERS' EQUITY			1,292,000		805,289
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY			$2,235,000		$1,972,773

SCHMIDT
GmbH

	Future (in thousands)				
	1999	Samson + Automotive	1995	Samson	1994
NET SALES	$5,100,000	580,000	$3,600,000	45,000	$3,092,868
Cost of products sold	1,680,000	162,000	1,200,000	15,000	1,088,046
GROSS PROFIT	3,420,000	418,000	2,400,000	30,000	2,004,822
Operating Expenses:					
Selling, general and administrative	1,300,000	200,000	1,200,000	11,000	1,107,064
Product development	600,000	130,000	650,000	95,000	498,200
	1,900,000	330,000	1,850,000	106,000	1,605,264
INCOME (LOSS) FROM OPERATIONS	1,520,000	88,000	550,000	(76,000)	399,558
Interest expense (income)	60,000	0	64,000	0	64,342
Other Income					
INCOME (LOSS) BEFORE INCOME TAXES	1,460,000	88,000	486,000	(76,000)	335,216
Income taxes	584,000	35,000	0	0	150,847
NET INCOME (LOSS)	$876,000	$53,000	$486,000	($76,000)	$184,369

Mechatronics, Inc.: US Robotics Manufacturer

PREGAME SCENARIO

Company structure, assets, and context for decisions

Your main business is automated assembly of printed circuit boards, and automated wafer handling. You also supply some robotics to the automotive industry. Additionally, you have developed some automated advanced packaging equipment, but have seen few sales. You have total annual sales of $75M, but your sales position has been slipping dramatically. You hope these new advanced packaging and MCM assembly tools will help you regain some lost business. Even though SEMATECH has declared your advanced packaging tools as the best in the field, the word has not gotten out, and they are still viewed as inferior to those available off-shore. You have a $1M R&D program with SEMATECH to develop advanced robotics, and a $400K ARPA contract on CAD/CAM simulation & software development. You also have a $400K jointly funded program with Jefferson National Laboratory (JNL) to develop advanced robotics concepts. You have several R&D efforts which could have significant impact on your business, but you lack the capital needed to implement them.

You have proposed the establishment of a manufacturing/user consortium for the development and manufacture of advanced robotics. Additionally, you have approached Infomatics about a joint development program.

Eighty-five percent of your sales are in the automotive and heavy industry market. Your Flint plant has been seeing annual profits of $16M, but much of this profit is supporting your losses in Lexington. The semiconductor operations was purchased by your company 4 years ago. You invested heavily in trying to make the semiconductor operations profitable. You have been working with ARPA and SEMATECH to develop advanced tools, and recently your most advanced packaging and assembly tool (Robo-APS) has been awarded best of the breed by SEMATECH. You have had Robo-APS tool evaluation sales to SEMATECH, AMD, Infomatics, and AT&T, but have seen no production level sales. Infomatics has been beta testing Robo-APS in their Mexico plant and are very satisfied with its performance.

You have 2 plants:

1) Semiconductor Equipment Operations - Lexington, Massachusetts
   This plant has accumulated a large debt. Estimated development costs for SAMSON automation are $50M per year over 3 years. This plant generates $25M of sales per year, borrows money at 12% annual interest, and employs 74 people at labor costs of $14 per hour for a "labor" (people plus debt retirement on automation) annual cost of $5.6M. The plant produces $4.50 of sales per dollar "labor" cost.

2) Automotive Products - Flint, Michigan
   This is also your headquarters. This plant generates $50M of sales per year, borrows money at 12% annual interest, and employs 86 people at labor costs of $13 per hour for a "labor" (people plus debt retirement on automation) annual cost of $6.4M. The plant produces $7.80 sales per dollar "labor" cost.

Issues and Possible Business Decisions

Option I: Lexington financial troubles.

You need to decide what to do with your semiconductor operations. Your investors are becoming increasingly dissatisfied with the poor performance of the Lexington operations. Possible options are:

1) Look for a buyer of the Lexington Operations.

2) Work to establish a market for the Lexington Machines.
This will require substantial capital since a major fear is the long-term survivability of the Lexington operations. Possible avenues for financing are:
2a) Borrow capital from a venture capital company in return for equity position.
2b) Obtain financing from Infomatics in return for equity and advanced exclusive access to new designs.
2c) Obtain Infomatics or Schmidt commitment to buy products under agreed upon conditions to encourage investors.

3) License the Robo-APS tool to Horioka for production

Option II: Technology development.

1) Expand joint development efforts with a national lab.

2) Obtain Infomatics commitment in consortium for TRP to develop US source of intelligent machines for manufacturing.

3) Obtain US Government assistance in creating US source of intelligent machines for manufacturing through SBIR grant.

Other Opportunities

Examine the Technology and Policy Toolkit for Initiatives for your team to push.

RESOURCES AVAILABLE:

Your team initially has $18M to spend on making deals and investing in Toolkit Options. Additional funds, if needed, must be raised through borrowing from the Green Finance Team or receiving funds from other teams.

The current price of your stock is $1.00 per share, with 8,050,000 shares outstanding.

MECHATRONICS GAME PLAY

Strategy

I. Send people to Federal Government, Horioka and Schmidt.
   A. Get a commitment from US Government to fund Mechatronics if Mechatronics can find a big customer for their product.
   B. Determine interest and benefit to industry.

C. Continue SEMATECH funding and establish Mechatronics as “best of breed.”

II. With partners determine Toolkit options for investment.
III. Raise $200M.
IV. Technology roadmap needed to benefit our partners/allies.
V. Become leading edge, global, robotics supplier.
VI. Provide competitive/cost advantage to users.
VII. Develop strategic alliances/partnerships with industry, government, universities, etc.
VIII. Diversify into related new markets, building on core competencies.
IX. Leverage business base, e.g. automotive robotics business.

Summit Topics

I. Make sure that international partners respect US intellectual property rights.
II. International partners don’t dump competitive products in the US.
III. Support manufacture on US soil (local content).
IV. Obtain equal access to foreign markets.

First Day Agreements

9/8/94 12:40 PM

Mechatronics, US Bank

US Bank agrees to loan Mechatronics $100M at LIBOR interest rate.

1. First 2 years interest only due, paid quarterly; loan is amortized over loan years 3-5.
2. Loan has a renewal option in 5 years.

An additional $100M is committed with an equity option, if the Glass-Steagall Act repeal is supported (Same terms as above apply)

9/8/94 3:30 PM

Mechatronics, Infomatics

Whereas Mechatronics grants to Infomatics exclusive rights to purchase Robo-APS equipment and all upgrades thereto as applied to all Samson class products, therefore Infomatics will pay the greater of $10M per year or 25% of Samson Division EBIT for years 8 through 20 of the Samson life cycle.

9/8/94 3:55 PM

Mechatronics, Infomatics

The Parties agree to cross license technologies acquired under the round 1 Toolkit options. The cross license allows each party the right to exercise the joint assets assigned to both parties as granted by the Green Team under round 1 Toolkit options. No funds exchanged.

9/8/94 4:00 PM

Mechatronics, Motorola

Motorola will purchase $100M of wafer handling equipment for new plant pending satisfactory installation. Motorola will buy wafer handling equipment for its next 3 plants . Valued at approx. $400M.

See News Bulletin.

9/8/94 4:05 PM

Mechatronics, US Bank

Confidential Agreement

The US Bank shall purchase $35M US equity at $7.50 per share.

The US Bank will extend a $65M loan to Mechatronics, renewable at LIBOR.

9/8/94 4:27 PM

US Government, Infomatics, EU Government, Mechatronics

The US Government agrees to fund the formation and operation of a consortium for advanced displays (to include advanced retinal technology) organized, led and managed by Infomatics and Mechatronics, with support from university and Government laboratories, Eurolaser and Schmidt as well as other sources that may be identified later. Funding over the next 5 years of $100M per year. Investment of European companies and Government support is strongly suggested.

First Round of Toolkit Investments and Outcomes

Successful Investments ($M)

Investment	Amount Invested	Partners / *other investors*
Robotic controllers for precision alignment	50	Infomatics, US Gov't
Packaging directly on displays reduces costs and weight by 50%	50	US Gov't, *Viewall, EU Gov't*
Glass-Steagall Act is repealed	20	Infomatics, US Gov't
Total successful investments	**120**	

Unsuccessful Investments ($M)

None

First Day End Briefing

- Basic survival strategy.
- Investigate market capability.
- Has a cash cow in the automotive industry, projecting 25% market share increase.
- Selling automation equipment to Motorola for their Scotland plant. (Ref. press release).
- Strategic support from US Government.
- $100M line of credit from finance.
- Participating in Mechatronics-Infomatics consortium to develop robotics capability.

Second Day Agreements (After Rootska Announcement)

9/9/94 9:45 AM

Schmidt, Mechatronics

Mechatronics shall supply Schmidt with production equipment for non-Samson type product applications, in particular automotive applications.

This will include an upgrade of the Munich plant (1996) and the construction of a new plant in Mexico (1997). Price of a turn-key installation will be $200M. Costs of the Munich plant upgrade will be negotiated as a function of the requirements.

9/9/94 10:11 AM

Eurolaser, Mechatronics

Mechatronics will supply Eurolaser with a turn-key, "state-of-the-art" display manufacturing facility in Europe for $180M. This equipment will be operational in 1997 and Mechatronics will supply Eurolaser with upgrades at the lowest price offered to other purchasers.

9/9/94 10:26 AM

Mechatronics, Rootska

The parties agree to create a subsidiary for advancement of R&D including exclusive rights of Rootska's AI software for robotics. R&D will consist of technology advancements for robotics with artificial intelligence that will increase the speed of robotics capability by 35%. The facility will be constructed in 1995 for $20M.

9/9/94 11:45 AM

Schmidt, Mechatronics

Schmidt makes available to Mechatronics the inference engine on a non-exclusive basis free of charge and Mechatronics upgrades the two contracted projects (upgrade of the Munich plant, and the new plant in Mexico) free of charge.

9/9/94 11:46 AM

Mechatronics, Dell-Webb, AARP

Dell-Webb will build a retirement community. Mechatronics will provide automation equipment for homes. AARP will support sales to members. Mechatronics will receive $50M to cover plant costs.

Final Round of Toolkit Investments and Outcomes

Successful Investments ($M)

Investment	Amount Invested	Partners / *other investors*
Consumption tax replaces income tax	30	Infomatics, US Gov't
Total successful investments	**30**	

Unsuccessful Investments ($M)

None

Final Briefings

I. Team had excellent players.

II. Became a leading edge, global, supplier.

III. Technology was a critical part of the equation.
IV. Formed strategic alliances and partnerships with industry and government.
V. Participated in the Samson revolution.
VI. Diversified the company into new markets. It is important to know your core competencies.
VII. Successfully leveraged Mechatronics base in automotive area - "Cash Cow."
VIII. Continued to re-invest to eliminate the debt load.
IX. Set-up a wholly owned subsidiary for each venture.
X. Established a robotics cross license to Infomatics plus cash and purchase guarantees.
XI. Sold robotics to Schmidt for automotive uses.
XII. Sold robotics to Eurolaser.
XIII. Part of a joint development effort with Schmidt, and Rootska for AI in robotics.
XIV. US Bank was overly generous with cash, which Mechatronics desperately needed.
XV. Invested in automating homes for the elderly.
XVI. Brought in bio-sensor technology for housing automation.
XVII. Established an agreement with Motorola to supply robotics for new plant in Scotland.
XVIII. A $66.7M tax rebate was donated to the US Government to open the Robotics Technical center of Excellence in conjunction with the national labs, universities and industry.
XIX. Insights:
    A. Outstanding experience.
    B. Technology investment critical.
    C. Relationships among bankers, suppliers and customers also critical.
    D. Timing is everything as it is in real life.
    E. Had a flexible, small company feeling.
    F. Strategic partnering is important.
    G. Government support and bankers flexibility was unrealistic.
    H. Need to computerize the balance sheets.
    I. Need prompt feedback from green team.
    J. Need to be able to quickly analyze financial impact of deals and decisions.
    K. Suggest linking teams via computer network.

Midday Analyst's Report Highlights

- Players were all CEO's, walked in and stated, "This company is dead meat".
- All knew how real life applies, had only 3 months of operating capital.
- Need cash immediately.
- Viewed some deals made by larger companies as being unrealistic.
- However, were able to accept reality.
- Bounded the game by reality and realistic assumptions.
- All played their roles well.
- After they got a line of credit, began deal making.
- Press release on their automotive unit gave them some needed cash.
- Moved into a new line of business.

ANALYST'S REPORT

The success of play by the Mechatronics team can be largely attributed to the close match between the roles defined for the team and the actual positions these players hold in the "real" world. The players were able to immediately place themselves into the context of the game since there was a close match between the size and market of their companies and those defined for Mechatronics Inc. This experience showed in the bounds the players struck between financial matters and technology. At the start of play, Mechatronics Inc. was virtually bankrupt. The players immediately focused on the financial needs of the company in order to maintain its solvency, rather than being dazzled by its technological capabilities. Because of the financial imperatives, considerable attention was paid to the financials of the company. There were some questions raised as to be believability of some of the figures. While this did not interfere with the players' abilities to maintain their roles, it emphasizes the importance as well as the difficulty of developing the game scenario.

The Mechatronics team initial structure followed the game suggestion of acting as a management board in which each player had a common role. As play progressed, the players developed increased degrees of specialization in their roles. This specialization reflected the particular talents and interests of the players and did not involve ego conflict or power grabs. Smooth play was further facilitated by agreement among the players as to negotiating tactics. Guidelines were agreed upon by the team for each negotiation, so that a single player could deal with another team without having to constantly return to the home team. A player was identified to remain in the team room in order to ensure that someone was always available to negotiate with teams coming to the Mechatronics team.

The team identified a couple of areas of improvement for future versions of the game. Because the game is so focused on electronics, it was felt that there would be great benefit to having a player assigned to the role of SEMATECH. The players also felt that the fidelity of play was best for the teams representing small companies and decreased as the teams represented larger companies or governments. This may be due in part to the fact that the small companies were represented by very high level executives of small companies while the large companies and governments were represented by comparatively lower level managers.

There was considerable enthusiasm among the players for the game. The players were unanimous in their belief that the game was a beneficial use of their time. There were a number of factors in the structure of the game that they felt could be improved. In particular, there was widespread support for a higher degree of automation or computerization of the game. In addition, to making the play easier and faster, computerized support would provide a greater degree of checks and balances on many of the funding issues that seemed to occasionally allow unrealistic choices.

The facilitator kept a flip chart for each company and government that Mechatronics decided to talk to. This included identifying the issues, points that need to be stressed, what Mechatronics was willing to give up. This technique helped both the facilitator and team members keep track of what was going on during the games. The facilitator also tried to record responses from the other teams and points agreed upon. These flip charts could be taken to the negotiations for use as

reminders of the issues. They also became the preliminary agreement documents. This experience should be shared as part of the training of facilitators for future games.

This round of the games provided an excellent view of the importance of a facilitator. The facilitator interprets what is required by specific times, keeps the team on schedule, reminds them of points they may have forgotten, gives direction to the recorder, and makes decisions about what is allowed and not allowed in the game. Because of the highly technical nature of the game topic, it is important that the game personnel have an understanding of the technical issues involved. In this play, the analyst was able to support the facilitator by providing the requisite technical expertise. It is possible to combine the role of analyst and facilitator, but only if the individual has the skills and technical expertise required for both roles.

Both the analyst and facilitator for this team strongly believe that the nature of the Mt. Weatherall facility played a significant role in the success of the game. The retreat-like nature of the facility insured that the players could focus exclusively on the game. The spartan nature of the facility, if anything, further contributed to the players' concentration.

Balance Sheets and P/L Statements

MECHATRONICS

ASSETS	Future (in thousands)				
	1999 All Product Lines	1999 Samson Only	1995 All Product Lines	1995 Samson Only	1994
CURRENT ASSETS					
Cash and Cash equivalents	50,000		50,000		1,500
Trade accounts receivable (net)	70,000		70,000		8,958
Inventories	80,000		0		7,569
TOTAL CURRENT ASSETS	200,000		120,000		18,027
PROPERTY, PLANT, AND EQUIPMENT					
Land	6,000		2,000		985
Buildings	12,000		2,000		1,206
Machinery and equipment	15,000		3,000		965
Less: Accumulated depreciation	(2,000)		500		270
	35,000		6,500		2,886
OTHER ASSETS			50		15
TOTAL ASSETS	$235,000		$126,550		$20,928
LIABILITIES AND STOCKHOLDERS EQUITY					
CURRENT LIABILITIES					
Accounts payable	110,000		40,000		9,850
Accrued liabilities	25,000		10,000		2,988
Current portion of long-term debt	500		4,000		0
TOTAL CURRENT LIABILITIES	135,500		54,000		12,838
LONG-TERM DEBT	7,000		46,000		0
TOTAL LIABILITIES	142,500		100,000		12,838
STOCKHOLDERS' EQUITY					80
Additional paid-in-capital					1,500
Retained earnings					6,510
TOTAL STOCKHOLDERS' EQUITY	88,500		26,550		8,090
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	$231,000		$126,550		$20,928

MECHATRONICS

	Future (in thousands)				
	1999	Samson Related	1995	Samson Related	1994
NET SALES	$1,140,000	359,000	$235,000	95,000	$75,000
Cost of products sold	684,000	215,000	157,100	57,000	44,250
GROSS PROFIT	456,000	144,000	77,900	38,000	30,750
Operating Expenses:					
Selling, general and administrative	162,200	50,282	36,300	20,800	37,500
Product development	25,000	7,750	14,000	6,000	1,425
	187,200	58,032	50,300	26,800	38,925
INCOME (LOSS) FROM OPERATIONS	268,800	85,968	27,600	11,200	(8,175)
Interest expense (income)	500	150	3,000	1,200	(124)
Other Income					0
INCOME (LOSS) BEFORE INCOME TAXES	268,300	85,818	24,600	10,000	(8,051)
Income taxes	80,800[(1)]	32,615	9,600	3,810	(4,106)
NET INCOME (LOSS)	$187,500	$53,203	$15,000	$6,190	($3,945)

Note (1): The company invested $100M in Robo-Sun City in 1997 - 1999. The source of these funds is tax rebates the company received due to retro-active tax code changes eliminating income tax. The amounts are:
1997 $50M 1998 $60M 1999 $80M

Viewall, Inc.,: Japanese Display Manufacturer

PREGAME SCENARIO

Company structure, assets, and context for decisions

You manufacture 95% of the world's 3-D displays for which you and MITI have invested $250M in their R&D. You are currently selling without prejudice to all US, European and Japanese companies. Your annual sales of all displays is $1B. Sales of 3-D displays at present is only $12M annually, but you expect this to grow to $300M in 3 years. You spend $100M annually in R&D and are developing bio-interfaces and sensors that could revolutionize the industry. This new technology is 3-5 years away. Your displays are performance limited by the electro-optic laser arrays manufactured in a subsidiary plant. You have interest in acquiring electro-optic array technology from Eurolaser, but have no deal pending.

Your Nagoya R&D center is developing low-power color 3-D displays needed for SAMSON. A critical component for these displays is a quantum-coupled laser diode modulator which you have developed and patented. However, additional technology is needed.

There are 3 options:

1) Use of a non- linear electro-optic element patented by Infomatics;
2) The use of Eurolaser developed laser arrays; and
3) Dichroic phase modulation to simulate color. You have already shown the applicability of dichroic modulation. However, this approach results in muted colors, but otherwise would meet all other performance objectives. You have been able to show superior color rendition when the non-linear optical elements are used, but production would require an Infomatics license. Eurolaser arrays could potentially make the best performance displays without the need for non-linear elements or quantum-coupled laser modulators. However, this technology is unproved and has only a 60% chance of success if fully funded.

Horioka has been assisting you in the 3-D display R&D and has been spending $20M annually in 3-D display technology.

You have 2 major facilities:

1) Nagoya R&D center
   Annual operating budget of $80M.

2) Tokyo Manufacturing center
   This plant generates $1000M of sales per year, borrows money at 10% annual interest, and employs 1817 people at labor costs of $15 per hour for a "labor" (people plus debt retirement on automation) annual cost of $153M. The plant produces $6.50 of sales per dollar "labor" cost.

Issues and Possible Business Decisions

1) Obtain financing for the development of the color displays.
   a) Encourage MITI to finance the development.
   b) Obtain investment capital.
   c) Obtain financing from Horioka.

2) You must decide how to proceed with the development of color 3-D displays.
   a) Obtain a license to manufacture and use non-linear elements from Infomatics.
   b) Negotiate a purchase and use agreement with Infomatics for these elements.
   c) Obtain financing to purchase Infomatics.
   d) Obtain a license for use and manufacture of laser arrays from Eurolaser. Note: This technology is yet unproved.
   e) Negotiate a purchase agreement from Eurolaser.
   f) Obtain financing to buy Eurolaser.
   g) Negotiate a joint development program with Eurolaser.
   h) Use dichroic modulation.

3) Work to assure continuing leadership in displays
   a) Negotiate long-term arrangements with Horioka.
   b) Negotiate long-term arrangements with Infomatics.
   c) Negotiate long-term arrangements with Schmidt.

Other Opportunities

Examine the Technology and Policy Toolkit for Initiatives for your team to push.

RESOURCES AVAILABLE:

Your team initially has $32M to spend on making deals and investing in Toolkit Options. Additional funds, if needed, must be raised through borrowing from the Green Finance Team or receiving funds from other teams.

The current price of your stock is $18 per share, with 9,002,800 shares outstanding.

VIEWALL GAME PLAY

Strategy

- Maintain market dominance in displays.
- Develop bio-sensor technology in 3 years.

Summit Topics

None given

First Day Agreements

9/8/94 12:51 PM

Viewall, Infomatics

Viewall agrees to manufacture displays for Infomatics for use in all Samson products in exchange for an exclusive technology license for Infomatics non-linear display component for a period of five years with an option to extend.

9/8/94 1:00 PM

Japanese Government, Horioka, Viewall CONFIDENTIAL

The parties shall collaborate in investing in the development of 3-D FPD's for $150.00 each to the following amounts:

Japanese Government	$100M
Horioka	$100M
Viewall	$180M

Horioka can be a second source with rights to the technology. Viewall shall have first manufacturing rights.

9/8/94 4:04 PM

Viewall, World Bank

Viewall will issue 4 million shares @ $18 per share for a total price of $72,000,000. Proceeds to be used for $50M 2-D facility expansion to meet expected world-wide demand in Samson. $22M to pay off old debt.

9/8/94 4:13 PM

Viewall, Japanese Government

Viewall will invest $15M in bio-sensor technology, while the Japanese Gov't to fund $35M over 3 years

9/8/94 4:15 PM

Viewall, Japanese Bank

Viewall to borrow $40M at Japanese Prime interest rate with standard pay-back terms. License agreement - $30M, Co-development - $5M.

9/8/94 4:20 PM

Viewall, Japanese Government, Horioka

Viewall agrees to build facility and purchase equipment for the development and production of new 3-D displays. Contributions to the new facility are:

Viewall $37.5M
Horioka $37.5M
J. Govt. $75M

First Round of Toolkit Investments and Outcomes

Successful Investments ($M)

Investment	Amount Invested	Partners / *other investors*
Packaging directly on displays reduces costs and weight by 50%	50	*Mech, US Gov't, EU Gov't*
Simulation tools integrated into system that reduces design time from 15 to 4 months	40	*Info, Schmidt, US Gov't, EU Gov't*
Improved feeding of thin laminate substrates improves yield by 30%	50	*Info, EU Gov't*
High resolution 3-D FPD's at $150.00 each[1]	180	Horioka, *Schmidt, EU Gov't*
Total successful investments	320	

Note (1) Horioka, Schmidt, and the Japanese Government had a written agreement to partner in the investment in low cost 3-D FPD's. The Japanese Government agreed to support this effort at $100M. After the Japanese Toolkit investments were brought to the Green Team it was found that they invested several hundred million more that they were allowed. The Japanese Government then eliminated this investment, leaving Viewall with a much reduced market share. Viewall asked for a Green Team ruling, citing Viewall's extensive internal investments in displays. The Green Team decided to give Viewall a 53% market share in 3-D displays, Eurolaser with a 47% market share.

Unsuccessful Investments ($M)

None

First Day End Briefing

- Signed agreements with Horioka and Infomatics on displays.
- 3 Major investments to double plant capacity in displays through stock sales and retirement of debt.
- Goal : $150.00, 3-D L.C. display, manufacturing plant which is 3x increased capacity over current plant. Joint technology development with Horioka and the Japanese Government.
- Developing substrates with 30% yield improvement.
- "Bio-Sensors" -> 10-30x the worlds investment + MITI support.
- Japanese Government refused international purchase.
- Increase 2-D manufacturing with assistance from Horioka and the Japanese Government, (plan to double output by $988M).
- Will sell displays to anyone.
- Invest 15% of R&D ($15M) in bio-sensors, asking the Japanese Government to match the investment.
- Elected not to invest in Viewall, dichroic displays.
- Plan was for Japan to own exclusively, high resolution 3-D, flat panel displays with all manufacturing rights by Viewall. However Japanese Government reneged on the agreement, giving Eurolaser a significant market share.

Second Day Agreements (After Rootska Announcement)

9/9/94 8:41 AM

Viewall, Infomatics

Viewall agrees to manufacture displays for Infomatics for use in all Samson products in exchange for an exclusive technology license for Infomatics non-linear display components for a period of 5 years with an option to extend with a minimum of 50K units.

9/9/94 9:15 AM

Viewall, Green Team

In recognition of Viewall's investment in Bio-sensor technology, Viewall has been granted an exclusive patent to Viewall's biosensor system. Viewall intends to market this system, which provides enabling technology for Rootska's inference engine and will dramatically

expand the market for Samson products. Viewall is planning to incorporate the bio-sensors in the same package as the display allowing the integration to reduce the manufacturing costs.

9/9/94 9:30 AM

Viewall, Horioka

Viewall shall be the vendor of choice for 70% of the Samson display needs. These standard 3D displays will be provided at $150.00 each in a quantity of 280,000 units in 1999. In addition the parties will work cooperatively to develop manufacturing technology for producing a chip-on-glass display based on Horioka technology which Viewall can sell to the market at large when a time or market target is met.

9/9/94 9:53 AM

Viewall, Infomatics

Amended Agreement

Viewall agrees to manufacture and sell to Infomatics, 3-D displays for use in Samson products in exchange for an exclusive technology license for Infomatics non-linear display components for a period of 5 years with an option to extend for another 5 years. 3-D displays will include the new bio-interfaces and sensors. Infomatics will agree to purchase a minimum of 1,000,000 3-D displays per year. Sales volume increases to be negotiated in good faith each year.

9/9/94 10:45 AM

Viewall, Rootska

To take advantage of the exclusive patent that Viewall has been granted for its integrated biosensor/display, Viewall & Rootska will technically collaborate to leverage the new I/O enablement of Rootska's inference engine. Viewall will tailor its devices to provide optimized I/O capability to the Rootska software & Rootska will develop the requisite class libraries for the new bio-sensor system with the knowledge and encouragement of Infomatics.

9/9/94 10:45 AM

Viewall, Horioka

Due to the development of the enhanced bio-sensor capability, Horioka intends to purchase all its displays with the unique Viewall bio-sensor system. This includes the 280,000 units Horioka had agreed to purchase in the 9/9/94-9:30 agreement. The bio-sensor display system will be provided at $175.00 each.

9/9/94 10:45:00 AM

Universities, Viewall

Samson University Inc. will technically collaborate to leverage the exclusive Viewall biosensor system with Samson University Inc.'s SSM and STTM transducers. By making the new I/O enabled Samson displays compatible with the S.U.Inc.'s modules, both companies will dramatically expand the market.

9/9/94 10:50 AM

Viewall, Japanese Government

The Japanese Government shall provide $50M, to be matched by Viewall for R&D development on:

1)Improvement in and to keep current, Viewall bio-sensors for improved performance of Samson;

2) Direct refined display with US and Japanese Universities.

9/9/94 11:05 AM

Viewall, Infomatics

In recognition of the criticality of bio-sensors to the demand of Samson products, Viewall will manufacture and sell to Infomatics, 3-D displays based on an exclusive technology license for Infomatics retinal display technology for a period of 5 years with an option to extend for another 5 years. These will include the bio-interfaces and sensors. Infomatics agrees to purchase a minimum of 60,000 3-D retinal/bio-sensor enabled displays per year at $550.00 each. Sales volume increases to be negotiated in good faith each year.

9/9/94 11:45 AM

US State Government, Viewall

The US State Government shall provide land for 5 years (free lease for 5 years, with an option for 20 years after that). 0% prop. on building and equipment for 5 years, worker training for manufacturing employees for 10,000 employees by year 5. Totaling $75M state investment. Viewall agrees to spend $75M for a plant to be built to productize Infomatics display technology.

Final Round of Toolkit Investments and Outcomes

Successful Investments ($M)

None

Unsuccessful Investments ($M)

None

Final Briefings

- Had a good strategy to dominate market share, yet maintain independence.
- Invested to provide long term dominance in bio-sensors.
- Maintained good relationships with Infomatics and Horioka.
- Licensed Viewall non-linear, chip-on-glass technology.
- Doubled plant investment, produced 2 new plants, one in Japan, one in the US (with State assistance) once the bio-sensor technology breakthrough occurred.
- Well on they way to maintaining the dominance of the display market, except for the glitch from the Toolkit investment pull-out by the J. Government.
- Merged bio-sensors with the display to provide added capability and product differentiation.
- Had a large university investment.
- Bought-out Horioka's share of the bio-sensor technology by selling options.

- Established bio-sensor sales agreements with all customers.
- Cross licensed retinal displays and bio-sensors with Infomatics.
- Refused to sell components to Horioka at a preferred price.

General Observations:
- Government's role is unrealistic, unconstrained dollars, too much influence, unrealistic pro-active stance, interest free grants.
- Game model is technology, not business based.
- Scenario was good and rich, but issues on market share too technology based.
- Should play multiple rounds with fixed time intervals.
- Need a simple set of financial constraints.
- The model was unconstrained and open loop. No Green Team feedback.
- The economic impact of decisions were too arbitrary.
- Teams must be allowed to fail.
- The alliances were key to the game's robustness.
- Need a true Japanese perspective.
- Inter-organizational relationships are key, most are strongly regionally based (realistic and honest).
- Non-technology policies that affect partnerships are critical.
- University opportunities matter.
-

ANALYST'S REPORT

Team Objectives:
- Control the display market by maintaining & growing market share.
- Invest in advanced techno logies especially bio-sensors.
- Get into Samson market.
- Avoid takeover.
- Make money in long run.

Team Characteristics:
- Behavior was very American (despite the presence of a Japanese player).
- Small (5 members first day, 3 members second day)
- Dynamic and Highly competitive
- Empowered and Focused
- Internalized

Team Discussions:
- The Team had a very brief discussion on their **financial situation.** The discussion was being interrupted by members of other teams who were beginning to "play the game". A few quotes from the discussions follow:

" Our equipment is old and depreciated. We may need to go to the government (Japanese) to update it. We do not want to spend our cash, but we have shares available to issue."

"Our expenses are too high. We have $1B in sales and are only making $14M. We need more profit on the parts we sell."

" We are on the edge of financial disaster."

At this point the Japanese Government asked for a meeting and a team member left to attend the meeting.

• The **competition and technical capabilities** were discussed. Viewall wants to remain in control of the market in 3-D Displays and get into the Bio-Interface & Sensors display market. The competition for 3-D displays includes Eurolaser and Infomatics, while the Bio-interfaces competition is mainly Schmidt. Quotes from the discussion follow:

"We must control the critical display technologies for Samson."

"Buy exclusive rights to flat display from Infomatics and sit on it."

"Get control of the Eurolaser advancement."

"The Bio-interfaces of Schmidt are in development, but they could revolutionize the industry."

"Leapfrog ahead and use most advanced technology for Samson display."

• Viewall's **relationship to the other companies** was discussed:

Infomatics - 3-D Displays manufacturers & buyer. Neither Viewall nor Infomatics can develop technology their own. A technology licensing agreement was suggested to give military control to them, but keep the rest of the market.

" Infomatics is a MAJOR customer of our products."

Horioka-is a purchaser of 3-D displays. They have been assisting in development of 3-D display.

"...Big guy on the block and MAJOR customer of our products."

Schmidt - competitor and may be potential customer , should contract to develop bio-sensors.

"...could be our customer if we get control of the bio-sensor market."

Mechatronics - US manufacturer

"...not in good shape, not a major player."

Eurolaser - competitor with a key technology, if proven successful would provide the important advancement in display technology.

"... have been trying to purchase their technology. We should try to form a consortium so there are no losers. "

Rootska - no direct contact; potential diversification.

"... may have employees we want to hire (talent source)."

Full team discussions soon became difficult because the team was small and the members were involved in individual deal making. The Innovator was used very few times. Often major decisions were made by one or two members. Often there was no opportunity to discuss new proposals. Most deals were made with little difficulty, which seemed to give Viewall team members the feeling that they could make them on their own. Soon their was little talk of teaming and more talk of dominating the market. Some telling quotes include:

"We need to be innovative and possibly break the rules somewhat by doing..."

"Lets do something dramatic, buy out Infomatics' rights to displays."

"...do a hostile takeover of Infomatics with the World Bank, that will make us competitors with Horioka."

Viewall came out quite well in the play and were very successful in making the deals they wanted. They were able to come from the "...edge of financial disaster" to regaining market dominance. While the Viewall players were excellent, their uncanny success may not be realistic. There seemed to be few "deal stoppers" or "road blocks", which in reality exist.

Strategic Objective:
Maintain market dominance in displays
Invest in Bio-Sensors to develop in 3 years

1. Increase 2-D Manufacturing with Assistance from Horioka and Japan Government [sell to all] (borrow $50M, $100M from Horioka, $150M from Gov't) Double output by +$988M

2. W-W Joint development of Eurolaser technology, through consortium. (Info, Schmidt, Horioka, and Japan Gov't)

3. EXCLUSIVE license to manufacture Infomatics technology (non-linear.) Infomatics pay $200M to complete non-linear technical development for better displays and license fees.

4. Invest 15% of R&D ($15M) in bio-sensors asking Jap. Gov't for $35M match (current competitive investment of $1.5M Esprit at Schmidt)

5. Not invest in our Dichroic Displays beyond R&D.

6. Japan to own exclusively $150 high res. 3-D flat-panel technology with all manufacturing by Viewall: $80M (25% of assets), $100M Jap Gov't (5%), $100M Horioka (1.2%) [THIS IS A CONFIDENTIAL INVESTMENT]

7. Japanese Gov't to lead W-W implementation of non-technology tool kit options:

Team Self Evaluation:
Play seemed to start around the Viewall team. As a result, any hope of the team taking more than a superficial look at the company's business, financial, technical status was lost. Only a cursory evaluation was made of their competition or their customers. They rarely re-evaluated their situation and did not follow up on deal making. For example, there was no reliable connection made with the Japanese government (this resulted in the Japanese Government reneging on a deal and not informing Viewall). There was no time for strategic planning, they just started to play. The strategic plan was developed as play was occurring around them and often the plan took on the nature of the particular deal that was being made at the time. This led to the unrealistic situation where the team was trying every possible scenario with no apparent implementation plan.

Team Dynamics and Nature:

There was no real leader; whoever was available at a particular time assumed leadership. This led to some confusion in goals and in deal making. This resulted in the team appearing to be fragmented. It often appeared that the team was in chaos and there was often a flurry of activity to meet deadlines.

Team Decisions had specific guidelines to follow and these were used to determine Toolkit Options only. Once the play intensified, the decisions generally were made ad hoc or were made by an individual on the spot. Little or no voting took place after the Toolkit Options vote.

The Team definitely assumed a U. S. nature. There was little attempt to play as a Japanese firm. Although the team had one Japanese player, he was not an aggressive player and did not give insight to the team as to how a Japanese company would really operate.

Game Plan:

Since there was no clear understanding of the company's overall status, the company plan was to pursue all options or cover all bases. This seemed unrealistic as small companies generally do not have the luxury of pursuing every business or R & D opportunity.

There was initial talk of teaming with other display manufacturers to form a worldwide consortium so there would be no losers. The first attempt to team was unsuccessful, so this option was tabled. The attitude of dominating the market and driving everyone else out of business prevailed.

The company did not stay in tune with the world outside their company. They paid little or no attention to news stories and often did not follow up on "deals" to insure commitments were kept.

The facilitator was part of play. The team members did nothing to discourage this and often turned to the facilitator for guidance.

For all the confusion, Viewall came out quite well in the play. With one exception (the deal upon which the Japanese Government reneged), all deals were quite successful.

Analysts Comments

The scenario that resulted with Viewall seem quite unrealistic to me. With the exception of the reneged Japanese government deal, they were able to make every single deal **t**hey wanted. There were never any real "deal stoppers" or "road blocks". While I have never been in business, I do know something about venture capital, business planning, and geopolitics and this scenario was **too** perfect.

If a goal of the Prosperity Games is to help us all do business differently, then the initial phases of the game may be more successful if they are structured toward the activities or behaviors you wish to encourage. Some teams started play immediately(a very USA thing to do), which made it difficult for those teams that wished to self-evaluate and plan. The teams should take the time to do a complete self-assessment and develop a long-term strategic plan. This might need to be a no play phase.

Balance Sheets and P/L Statements

VIEWALL

ASSETS	1999 All Product Lines	1999 Samson Only	1995 All Product Lines	1995 Samson Only	Future (in thousands) 1994
CURRENT ASSETS					
Cash and Cash equivalents					1,036
Trade accounts receivable (net)					15,951
Inventories					14,659
TOTAL CURRENT ASSETS	690,000		100,000		31,646
PROPERTY, PLANT, AND EQUIPMENT					
Land	10,000		5,000		931
Buildings	100,000		50,000		13,672
Machinery and equipment	640,000		200,000		36,085
Less: Accumulated depreciation	150,000		60,000		34,007
	600,000		195,000		16,681
OTHER ASSETS	10,000		5,000		4,699
TOTAL ASSETS	$1,300,000		$300,000		$53,026
LIABILITIES AND STOCKHOLDERS EQUITY					
CURRENT LIABILITIES					
Accounts payable					4,381
Accrued liabilities					970
Current portion of long-term debt					1,800
TOTAL CURRENT LIABILITIES	87,000		42,000		7,151
LONG-TERM DEBT	40,000		45,000		24,540
TOTAL LIABILITIES	127,000		87,000		31,691
STOCKHOLDERS' EQUITY					90
Additional paid-in-capital					300
Retained earnings					20,945
TOTAL STOCKHOLDERS' EQUITY	1,173,000		213,000		21,335
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	$1,300,000		$300,000		$53,026

VIEWALL

	Future (in thousands)				
	1999	Samson	1995	Samson	1994
NET SALES	$3,635,000	335,000	$1,500,000	217,000	$1,080,400
Cost of products sold	2,000,000	160,000	600,000	100,000	474,296
GROSS PROFIT	1,635,000	175,000	900,000	117,000	606,104
					0
Operating Expenses:					0
Selling, general and administrative	625,000		400,000		490,000
Product development	300,000		150,000		100,000
	925,000		550,000		590,000
					0
INCOME (LOSS) FROM OPERATIONS	710,000		250,000		16,104
					0
Interest expense (income)	10,000		10,000		2,108
Other Income					0
					0
INCOME (LOSS) BEFORE INCOME TAXES	700,000		240,000		13,996
					0
Income taxes	350,000		120,000		0
					$0
NET INCOME (LOSS)	$350,000		$120,000		$13,996

Eurolaser GmbH.: European Electro-Optics Company

PREGAME SCENARIO

Company structure, assets, and context for decisions

The most challenging roles, and often the most rewarding, are the least structured. Your team's role is designed to be one of these. It offers great opportunity for initiatives, some of which may be stimulated by the Toolkit options. Please, never resist the temptation to take initiative.

You manufacture electro-optic devices. One of the technical challenges to high performance 3-D displays is a high-quality electro-optic laser array. You have emerging technology which could revolutionize the 3-D display field, but do not have the financial ability to commercialize.

In the military version of SAMSON developed by Infomatics, the B&W 3-D display is the single largest power consuming device, and adds about 5 lbs. to the device weight. Infomatics, as well as Viewall, have been working on a color 3-D display that would cut the power consumption in half, and the display weight to 2 lbs. The display used by Infomatics in the military product is purchased from Viewall. Infomatics has an important patent on a non-linear optical element needed for color 3-D technology, but Viewall has an important patent on quantum-coupled laser diodes, used in the B&W displays and directly applicable to the color displays. Your 3-D laser array technology could substantially improve performance without the need for the expensive non-linear optical elements or quantum-coupled laser technology.

Viewall has been trying to purchase your technology/company, but has been unable mainly because of political reasons. Your display R&D is financed on a $2M ESPRIT contract and $1M from the German Government. Your manufacturing center has been financed under the re-unification program and is currently producing several electro-optic and high speed GaAs products. Germany and the US have opened the dialog about cooperative efforts in microelectronics. The electro-optic laser arrays you are developing could dramatically improve 3-D color displays while at the same time reduce costs and weight.

You would like to produce the electro-optic arrays, but an additional $40M will be required in development costs, and $60M in new capital equipment for production.

Your company is located in Dresden and cooperates with the Max Plank Institute in display development. You spend $175M annually in product development and R&D.

Issues and Possible Business Decisions

1) Decide to develop and manufacture the laser arrays, or develop and license the technology, or license what you currently have.

2) Obtain financing for the development of the laser arrays. Approximately $20M will be required over the next 2 years. There are still some technical challenges in product lifetime and laser stability. If you can find the funding you will have a 60% probability of success in solving these challenges.

3) Decide to produce 3-D displays based on your laser technology. An additional $150M will be required over 3 years.

4) Work to obtain continuing funding for R&D on a new laser from European government possibly with Schmidt as a partner.

5) Obtain continued (increased) funding for R&D on a new laser directly from ESPRIT.

6) Obtain continued (increased) funding for R&D on a new laser directly from Schmidt partner.

7) Negotiate with Horioka, Infomatics, and/or Schmidt for laser application in next generation 3-D display for SAMSON.

8) Work with Schmidt on the development of device applications in medical electronics or automotives.

Other Opportunities

Examine the Technology and Policy Toolkit for Initiatives for your team to push.

RESOURCES AVAILABLE:

Your team initially has $5M to spend on making deals and investing in Toolkit Options. Additional funds, if needed, must be raised through borrowing from the Green Finance Team or receiving funds from other teams.

The current price of your stock is $2.25 per share, with 9,002,800 shares outstanding.

EUROLASER GAME PLAY

Strategy

- Complete development of laser array technology.
- License and produce laser array technology.
- Obtain capital from European Government.
- Produce display products.
- License technology to Viewall and others.

Summit Topics

First Day Agreements

9/8/94 Time Unknown

EU Government, Schmidt, Eurolaser

The parties agree to form a consortium to develop Samson technology. The consortium shall be industry led and Government facilitated.

9/8/94 Time Unknown

Eurolaser, EU Government

This is to codify that the EU invested $300M on behalf of Eurolaser (and was successful in this Toolkit option). Eurolaser now controls 45% of the global market. Displays are predominately manufactured in Europe.

9/8/94 12:52 PM

Schmidt, Eurolaser

Schmidt makes an offer to purchase Eurolaser for $15M (premium of approximately 50% over market value) for 100% of the company. (EU M&A board will not block). See section IV.

9/8/94 4:30 PM

Eurolaser, EuroBank

EuroBank agrees to lend Eurolaser $100M on 2 year revolver at LIBOR.

Lawsuit on Attempted, Hostile Take-over of Eurolaser by Schmidt

At 12:52 PM Schmidt presented the Green Team with an offer to purchase 100% of Eurolaser at 50% over market value. The Green Team authorized the purchase assuming that the EU Governments had approved of the purchase. Eurolaser strongly objected and filed a suit. The Green Team court decided in favor of Eurolaser citing that EU Borse laws require notice and approval of purchases greater than 5% of any company. Schmidt could not prove they had approval by the EU government for such action.

Suit filed by Eurolaser

Subject: Illegal, hostile take-over of Eurolaser. Suit against Schmidt.

A suit has been filed against Schmidt for illegally attempting to take over Eurolaser operations. This take-over attempt has had a direct impact on Eurolaser's ability to perform our management functions. It has impacted already, two possible deals that were in negotiation, one for possible sale of the company, and the other to license the technology for the proposed sum of $30M, plus a royalty stream (yet to be determined). As a result the prospective company has reduced its offer and is now waiting to determine the outcome of this suit. The take-over has also impacted the morale of the corporation, reducing the productivity of the staff. As such Eurolaser is asking for $500M in damages and bar them from any future unfriendly attempts.

Notes on company takeovers in Europe

Any company, firm or legal entity that wishes to purchase, own, or otherwise, "take-over" another company, firm, or, other legal entity by the purchase of more than 5% of the outstanding voting stock must file with the German Börse within ten days of that intended purchase. Furthermore, the company, firm, or, other legal entity must notify the target company of that intended purchase and provide the following:

1. The name of the prospective buyer,
2. The numbered percentage of shares to be purchased, and
3. Their intentions as to the future of the target company.

The Green Team court decided that Schmidt was not permitted to purchase more than 5% of Eurolaser, and no damages would be awarded to Eurolaser.

First Round of Toolkit Investments and Outcomes

Successful Investments ($M)

Investment	Amount Invested	Partners / *other investors*
Hi-resolution 3-D FPD's for $150.00 each	0	EU Gov't, Schmidt *Horioka, Viewall*
Total successful investments	**0**	**370/280**

Note: Though Eurolaser invested nothing in 3-D FPD's, the EU/Schmidt investment was assigned to Eurolaser giving them 45% market share in 3-D FPD displays. There were some heated arguments with the Green Team on how much weight, the Toolkit investments would have, but the Green Team held its position on early statements that market share would be based proportionally on the Toolkit investments.

Unsuccessful Investments ($M)

Investment	Amount Invested	Partners / *other investors*
0.2µm precision assembly technology improves yield 30% and lowers cost.	50	EU Gov't
Total unsuccessful investments	**50**	**130**

First Day End Briefing

- Obtained EU Government deal for new technology development.
- Added manufacturing facilities in Europe to achieve 46% market share.
- EC will build factories in Europe.
- Funds needed for plant construction.
- Developing a retinal projection system. 6-10 years away.

Second Day Agreements (After Rootska Announcement)

9/9/94 7:48 AM

EU Government, Eurolaser

The parties have agreed to each supply $10M to the European University system for advanced research in brain wave interface technology for Samson. Based on centuries of research in biology and medicine, 200 years of research in electro-magnetics and 75 years research in electronics, the technical universities of Europe have demonstrated in the laboratory the first machine-human interaction by brain waves. In the demonstration, human thoughts could be recognized by the computer and images generated by the computer were perceived by the individual wearing the interface. Further refinement is required.

9/9/94 8:36 AM

Eurolaser, EU Government

The EU Governments transfers the following Toolkit investments to Eurolaser:

Substrates/ thin film laminates (50% position)

Reduced cost display packages

9/9/94 9:27 AM

Eurolaser, Schmidt

In exchange for market share of Schmidt displays, Eurolaser agrees to grant Schmidt preferential treatment with the delivery of all displays regardless of use. This agreement stands for a period of 3 years.

9/9/94 10:11 AM

Eurolaser, Mechatronics

Mechatronics will supply Eurolaser with a turn-key, "state-of-the-art" display manufacturing facility in Europe for $180M. This equipment will be operational in 1997 and Mechatronics will supply Eurolaser with upgrades at the lowest price offered to other purchasers.

9/9/94 11:15 AM

Universities (EU and US), Eurolaser, US Government, Infomatics

The organizations will enter into a collaborative effort in R&D on non-invasive human brain I/O with necessary signal processing. The effort will total $800M over 4 years.

Final Round of Toolkit Investments and Outcomes

Successful Investments ($M)

Investment	Amount Invested	Partners / *other investors*
Non-invasive neural-based I/O for Samson	200	Infomatics, US Gov't, EU Gov't
Total successful investments	**200**	**600**

Unsuccessful Investments ($M)

None:

Final Briefings

Had an initial hostile take-over attempt by Schmidt, Was refused by the Green Team court.

Strategies

- Develop laser array technology as a key component for advanced 3-D color displays.
- Persuade European Government to provide R&D manufacturing grant to use laser array technology as a lever to get into the display business.
- Team up with Schmidt in a European Alliance for a stake in the Samson business.
- Look for Partners to develop future generation display I/O technology

Company Development

- Through a $40M grant from the European Government, key display technology was perfected.

- On the strength of this success, the European Government agreed to fund Eurolaser with $300M to set up a plant for producing displays in Europe. Due to Eurolaser's advanced and comparatively inexpensive display, Eurolaser succeeding in capturing a market share of 22% in 1995, growing to 56% in 1999.
- Through the good offices of the European Government a Euro Alliance was formed to advance EU interests in the Samson arena. Spearheaded by Schmidt. Agreements were entered into with certain Japanese and US players in this field, securing the position of Schmidt as an OEM with Eurolaser as a preferred supplier.
- A development cooperation has been set up with Infomatics, the US Government, US Universities, EU Universities, and the EU Government to pursue the development of a non-invasive, neuro I/O technology to be used for future Samson devices and related applications, using breakthrough inventions of US and EU Universities. This should secure the future of Eurolaser and is likely to increase market share and open up new applications.

Midday Analyst's Report Highlights

- Small team, with good communication. Decisions were made quickly.
- Good team dynamics, no dominate personalities, everyone acted as a generalist.
- Everyone well prepared. Came in on Thursday morning ready to go.
- Every day had a new strategy.
- Became a producer.
- Developed brain wave technology.
- Fast Paced.
- Took good advantage of the Toolkit.
- No advantages taken on the policy options.

ANALYST'S REPORT

I. Team Objectives

Option A: Sell the Company
Selling the laser array key technology for an estimated $50M was seen as a low-risk, short-term option.

Option B: Maximize long-term profitability
--Complete development of 3-D laser array technology
--Promote and join a European Alliance
--License laser array technology to obtain capital
--Capture a portion of the display production market as a second source supplier

The option of selling the company was considered briefly, but rejected by all team members. The option did not provide the greatest long-term return for stockholders and was not conducive to the play of the game.The objectives to maximize long-term profitability were brainstormed and accepted without debate.

II. Team Characteristics

As a small company, and only 4 players, the Eurolaser team acclimated quickly into a cohesive group. The players included the president of a small Austrian technology company and three US electronics industry participants. Specific roles for Eurolaser team members were not set and did not even evolve - the players acted as generalists in the pursuit of the team objectives.

Each member of the Eurolaser team was active in negotiations with other teams. The goals of emissary missions were discussed as a group. Travel to make appointments and negotiate agreements was usually done by one player per trip. The player would return to the team base to report the results to the team. Visiting emissaries from other teams were greeted warmly and negotiations were conducted either with the group or with a single Eurolaser player.

III. Team Discussions/Deliberations/Conclusions/Quotes

Three of the four players were actively vocal but no player dominated the discussion. The fourth was more reserved adding few original ideas but willing to participate in negotiation activities. In strategy sessions, the players listened respectfully to the ideas of the others, contributed related thoughts (pros & cons) and quickly came to conclusions on actions to be taken. Activities and negotiation roles were divided randomly except when prior relationships with members of other teams could be beneficial. Overall the decisions and actions of the Eurolaser team were swift as one would expect in a small company.

Strategy for Eurolaser

Objective A: Complete development of 3-D laser array technology.
Background: Based on the cost data submitted by the Green team, the cost to Eurolaser of developing and manufacturing displays is $150M. The Eurolaser team dissected the cost into R&D: $40M and Production: $110M. The conclusion drawn was that Eurolaser needed $40M to complete development of the laser array technology.

Strategy 1: Obtain financial backing from the European government
Strategy 2: Sell laser array licenses to Viewall and/or Infomatics
Strategy 3: Partner with Schmidt for R&D and manufacture

Objective B: Promote and join a European Alliance
Strategy: Join discussions and support European priorities

Objective: License laser array technology to obtain capital
Background: Viewall has been unsuccessful in their attempts to purchase Eurolaser's technology or the company. Infomatics has a patent on a non-linear optical element needed for color 3-D; but, our technology is a less expensive option and increases performance.
Strategy 1: Negotiate a licensing agreement with Viewall.
Strategy 2: Open discussions with Infomatics and other OEMs.

Objective C: Capture a portion of the display production market
Background: The technology ToolKit option to develop and produce Flat Panel Displays (FPDs) is estimated to cost Eurolaser $150M for a 50% probability of success.
Strategy: Convince the European government of the benefits of leading the world in the field of displays.

The following negotiations are listed in the order in which they were started.

DAY 1

European Government Alliance.
Substantial cooperation between the government and companies laid the groundwork for a European Alliance to benefit European industry, jobs, and quality of life. Eurolaser debated the benefit to Europe of completing development of the laser array technology and capturing a portion of the display manufacturing market convincing the government to investment by the government in the ToolKit option for flat panel displays. In negotiation, Eurolaser agreed to invest its available assets ($5M) in government-priority ToolKit options (value=$50M) in return for $40M of capital to complete development of the laser array technology plus any return on the government's investment in flat panel displays (FPD).

Schmidt offered $70M to be added to the government's FPD investment. Schmidt wanted a pro-rata portion of the display market or 49% ownership in return for their investment. Eurolaser convinced the government to reject Schmidt's $70M. Schmidt subsequently invested the $70M on their own behalf.

In the end, the government invested $300M in High Resolution Flat Panel Displays (FPD) on Eurolaser's behalf.

Offer from Horioka/Viewall.
On-going talks with Horioka produced several options: (1) sell company for $100M (2) license laser array technology exclusively to Viewall or (3) cross-license technology with Viewall and become a second-source supplier of displays to Horioka. The team rejected the idea to sell. Horioka returned with another option: (4) sell 50% of the company for $50M. Eurolaser countered directly to Viewall with a non-exclusive licensing option for a fee of $30M plus royalties.

Schmidt's Hostile Takeover Attempt.
Without the knowledge of Eurolaser or the European government, Schmidt attempted to buy the outstanding shares of Eurolaser stock in a hostile takeover bid. Eurolaser sued Schmidt over their illegal procedures. Schmidt had not contacted the Securities Board (i.e. government) before attempting to take over Eurolaser. The Green team ruled, Schmidt retracted its bid, and Eurolaser dropped the lawsuit.

DAY 2

Toolkit Results.
The investment in High-Resolution Flat Panel Display (FPD) technology was successful. Investments were made by Horioka (100), Schmidt (70), Viewall(180) and European government (300). Per the European Alliance agreement, Eurolaser received the 56% market share that was won by the government. According to the Green team, the new FPD technology does not immediately render previous technology obsolete. A three-year phase-in of the new displays was determined to be appropriate with Eurolaser's share of the display market increasing as follows:

	1995	1996	1997	1998	1999
Share of Display Market	22.5%	30%	56%	56%	56%
Revenue ($M) *	$67	$135	$330	$420	$670

* includes SAMSON displays + other markets at 10 times SAMSON

Status and New Strategy for Eurolaser.
The development of the 3-D laser array technology was completed with the $40M funding stream from the European government. The successful investment in FPD technology provided manufacturing capability in 1995 allowing production of displays using the current technology immediately and gearing up for a phase-in of FPD production over a 3-year period.

Eurolaser had accomplished all its original objectives. With a healthy revenue stream, the following additional objectives were set.

Objective A: Build and improve the manufacturing capacity to produce Eurolaser's share of the display market.
Strategy 1: Evaluate current capacity estimating future needs.
Strategy 2: Obtain improved manufacturing processes from Mechatronics.

Objective B: Invest in R&D of the next generation display technology including direct retinal displays and possibly brain waves.
Strategy: Obtain funding for R&D from venture capitalists.

Capital Accumulation.
Eurolaser arranged for a $100M line of credit from the EuroBank. In addition, Eurolaser became the beneficiary of a cooperative effort between European and US governments for $100M towards R&D of next generation displays. The European government also offered to match funding used to sponsor university R&D.

More Support from the Government.
Eurolaser was as the beneficiary of the European government's successful investments in Substrates and Reduced display packaging.

Mechatronics Manufacturing Facility.
Mechatronics agreed to supply Eurolaser with a turn-key "state of the art" display manufacturing facility to be located in Europe for $180M. The equipment is expected to be operational in 1997 allowing Eurolaser to meet increasing demand. The agreement with Mechatronics also included

preferred-customer pricing for future upgrades.

Eurolaser and Schmidt agree to work together.
Eurolaser and Schmidt agreed to put their differences behind them and work together. Schmidt requested preferential treatment in Eurolaser's delivery of displays for a period of three years. In return, Eurolaser receives preferred supplier status at Schmidt.

Pursuit of Brainwave Technology.
The European government matched Eurolaser's funding ($10M each) for advanced research in brain-wave interface technology for SAMSON. After the concept had been validated, an $800M joint investment ($200M each over four years) was made by Eurolaser, US government, European government, and Infomatics to fund US and European University research of non-invasive human I/O with necessary signal processing. The Green team determined that a 50% probability of success would cost $500M. The investment was successful.

IV. Analyst's Insights/Evaluations

Players and support staff alike found the play of the game exhilarating and fun. The heightened level of excitement was a contributing factor in forming working relationships and camaraderie that will surely outlast the Prosperity Games. Some insights drawn include:

-- The scenarios were very well constructed. The introduction of new situations forced teams to refocus and realign objectives. As expected, smaller teams were able to adapt to change more quickly.
-- The Innovator boxes were not useful in our small group because consensus was found quickly through team interaction.
-- Although the GreenTeam's product used to simulate the success/failure was viewed as objective, it appeared that more success was generated than failure. Perhaps the success-rate was a function of non-realistic over-investment to inflate the chance of success.
-- The fluidness of time was difficult to understand as we tried to evaluate the return on investments. The confusion in assessing our current status caused delays in implementing the next stages of our strategy. For example, did we have the resources or do we need to borrow to purchase an additional ToolKit option?
-- The play of the game was valuable in determining which technology ToolKit options were valuable in the development and production of a product with SAMSON-like technology characteristics. The game also produced some technology options not included in NEMI. However, most teams gave little consideration to the policy options. Common opinions of why included: (1) the success of policy options is difficult to quantify and reflect in the game, (2) negative scenarios prompting government or industry action did not exist -- like, a shortage of trained workers, stockholders selling when quarterly profits are low, or companies unable afford to expand because of the high cost of capital (3) policy options were not related to countries other than the US

V. Areas for Improvement

The areas of improvement in the game process, as expressed by the players, include:

-- Timely response to teams on effects of investments and decisions.
-- Hold deadlines firm. Do not allow late entries past deadlines.
-- Incorporate negative scenarios to simulate societal demands on government and industry.

Balance Sheets and P/L Statements

EUROLASER

ASSETS			Future (in thousands)		
	1999 All Product Lines	1999 Samson Only	1995 All Product Lines	1995 Samson Only	1994
CURRENT ASSETS					
Cash and Cash equivalents					560
Trade accounts receivable (net)					2,500
Inventories					2,000
TOTAL CURRENT ASSETS	495,000		46,500	7,600	5,060
PROPERTY, PLANT, AND EQUIPMENT					
Land	8,900		1,000	100	10
Buildings	17,600		6,750	675	2,000
Machinery and equipment	174,000		92,000	9,200	3,575
Less: Accumulated depreciation	(100,000)		(49,000)	(4,900)	2,250
	300,500		148,750	14,875	3,335
OTHER ASSETS	345,000		62,000	6,200	158
TOTAL ASSETS	$1,140,500		$257,250	$28,675	$8,553
LIABILITIES AND STOCKHOLDERS EQUITY					
CURRENT LIABILITIES					
Accounts payable	210,000		61,000	10,346	1,573
Accrued liabilities	606,000		137,350	6,897	20
Current portion of long-term debt	95,000		1,500	0	50
TOTAL CURRENT LIABILITIES	911,000		199,850	17,243	1,643
LONG-TERM DEBT	100,000		25,000		2,000
TOTAL LIABILITIES	1,011,000		224,850		3,643
STOCKHOLDERS' EQUITY					46
Additional paid-in-capital					2,730
Retained earnings					2,134
TOTAL STOCKHOLDERS' EQUITY	29,000		4,910		4,910
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	$1,040,000		$229,760		$8,553

EUROLASER

	1999	Samson	Future (in thousands) 1995	Samson	1994
NET SALES	$670,000		$67,000	6,700	$3,500
Cost of products sold	421,000		23,450	2,340	1,365
GROSS PROFIT	249,000		43,550	4,360	2,135
Operating Expenses:					
Selling, general and administrative	27,300		3,875	387	525
Product development	50,000		2,500	2,500	175
	77,300		6,375		700
INCOME (LOSS) FROM OPERATIONS	171,700		14,675	1,467	1,435
Interest expense (income)	10,000		10,000	1,000	175
Other Income	12,000				0
INCOME (LOSS) BEFORE INCOME TAXES	159,700		4,675	467	1,260
Income taxes	79,800		2,337	233	542
NET INCOME (LOSS)	$79,900		$2,338	$234	$718

US/State Government Team

PREGAME SCENARIO

The most challenging roles, and often the most rewarding, are the least structured. Your team's role is designed to be one of these. It offers great opportunity for initiatives, some of which may be stimulated by the Toolkit options. Please, never resist the temptation to take initiative.

The US Government team's goal is to promote US political, social, military and economic agendas.

The ever-increasing budget deficits have severely impacted national spending. The voters are determined to hold taxation and reduce spending. Next year is an election year and Congress is faced with declining manufacturing and rising deficits.

One of the biggest potential markets for SAMSON is in China. However, China has recently had another Tiananmen Square incident. You have significant pressure to impose sanctions from the human rights activists, and pressure from industry to continue Most Favored Nation status.

Jefferson National Laboratory, JNL (a US government lab), has been developing "super capacitors" as possible, long-life, rechargeable power cells for automotive and portable electronics applications. JNL is seeking funding of $50M annually to develop these technologies.

Issues and Policy Options

1) Decide on US Government assistance in creating a US source of intelligent machines for manufacturing through an SBIR grant.

2) Decide on a consortium TRP (Technology Reinvestment Project) to develop a US source of intelligent machines for manufacturing.

3) If asked, decide on allowing or disallowing Infomatics to purchase Mechatronics, or on any company purchasing or being purchased by another company.

4) Provide funding for laboratory development of super-capacitors.

5) Provide cost-shared funding for laboratory development of super capacitors with Infomatics.

6) Provide procurement incentives that would create an expansion in intelligent machines production.

7) Review and decide on importing Horioka intelligent machines for the Infomatics purchase.

8) Prepare and present a US proposal for a European-US Free Trade Agreement or US-Japan Free Trade Agreement or both.

9) Establish a more protectionist stance to shield US industry.

10) Revise NAFTA and/or GATT.

11) Continue Most Favored Nation Status with China or impose sanctions.

12) Discuss your own options.

Other Opportunities

Examine the Technology and Policy Toolkit and the Supplementary Material to stimulate initiatives for your team to push. Create a Technology Delivery System compatible with your culture.

RESOURCES AVAILABLE:

Your team initially has $500M to spend on making deals and investing in Toolkit Options. Additional funds, if needed, must be raised through borrowing from the Green Finance Team.

US GOVERNMENT GAME PLAY

Strategy

- US wants to be a leader in Samson and underlying technologies.
- Meet with US companies to determine if a consortia can be formed to develop critical technologies.
- Negotiate with Japanese and European governments for international standards, open architectures, and trade issues.
- Explore international industrial cooperation.
- Promote, develop and utilize educational, business and societal opportunities based on Samson.
- Develop capabilities, a la Fraunhofer Institute-like, to make transition from research to manufacturing.
- Focus on display and energy systems for value added technology investment and development.

Summit Topics

First Day Agreements

9/8/94 11:30 AM

Universities, Infomatics, US Government

Infomatics agrees to sell to universities 10,000 early models at $100 each, which is $50.00 below manufacturing cost, and thereby invests $500K. ARPA (the US Government) pays for the units and also $500K fixed costs - total $1.5M. The universities deploy the units. Students develop applications and start 3rd party industry in applications for the company's products, thereby increasing the company sales 10%. This increase remains in future years because of increased public interest in the product.

9/8/94 4:27 PM

US Government, Infomatics, EU Government, Mechatronics

The US Government agrees to fund the formation and operation of a consortium for advanced displays (to include advanced retinal technology) organized, led and managed by Infomatics and Mechatronics, with support from university and Government laboratories,

Eurolaser and Schmidt as well as other sources that may be identified later. Funding over the next 5 years of $100M per year. Investment of European companies and Government support is strongly suggested.

First Round of Toolkit Investments and Outcomes

Successful Investments ($M)

Investment	Amount Invested	Partners / *other investors*
Robotic controllers for precision alignment	100	Infomat, Mech *Schmidt, EU Gov't*
Packaging directly on displays reduces costs by 30%	100	Mech, *View, EU Gov't*
Simulation tools integrated into a system that reduces design time from 15 to 4 months.	50	Infomatics *Schmidt, Viewall, EU Gov't*
Implement NEMI roadmap; making US the location choice for electronics manufacturing.	400	
Industry associations and the EPA form partnerships to improve environmental regulations, reducing compliance cost by 50%.	200	
State establishes a work force training program.	150	
Glass-Steagall act is repealed.	200	Infomatics, Mechatronics
Critical industries encouraged to pursue consortia with national labs.	400	
Total successful investments	**1600**	

Unsuccessful Investments ($M)

Investment	Amount Invested	Partners / *other investors*
ARPA program provides computer models for replacing extensive prototyping.	200	
Abusive shareholder suits on stock fluctuations are curbed by government action.	80	
Total unsuccessful investments	**280**	

First Day End Briefing

- Endorse the educational opportunities of Samson, esp. from Japanese offers.
- Develop next generation of display technologies.
- No fair trade deal with Japan.
- Deficit ???
- University to receive 10K Samson units supplied by Infomatics.

- Fraunhofer like institutes in US turned down by USG, but successfully negotiated with Japan.
- Horioka established a California software development company.

Second Day Agreements (After Rootska Announcement)

9/9/94 8:59 AM

US Government, EU Government

The parties establish an MOU between the US and European Governments to establish collaborative institutes with locations in the US and Europe to develop bio-sensor controlled brain-wave communication between people and machines with an open access to all institutes by all participants. $10M initial funding from each Government.

9/9/94 9:41 AM

Universities, Infomatics, US Government

Each Rootska employee will be contacted individually. The US Government will offer immigration visas and employment assistance to spouses and families. Infomatics or US Universities will offer employment to the Rootska employees.

9/9/94 9:41 AM

US Government, Universities,

Congressman Dingle's committee has agreed to investigate alleged infringements by Rootska of MIT and UNM patents. The US trade representative will be watching carefully. ARPA concurs that these patents were invented under Government contract.

9/9/94 9:50 AM

Infomatics, US Government, Universities

Infomatics sponsors at $50M, a Fraunhofer Institute capable of reverse engineering AI software, including that of foreign engines. The US Government sees no objection to this. The center will be known as CARE - Center for Advanced Reverse Engineering.

9/9/94 10:10 AM

US Government, US Bank, Infomatics

The US Government agrees to provide OPIC coverage of the US Bank loan of $300M to Infomatics for their 40% share of the factories in China. Because of the extreme time pressures associated with expansions into this major new market, the Government will be forced to postpone the banking hearings indefinitely. *(Deal not consummated.)*

9/9/94 10:15 AM

US Government, Universities

In informal discussions, the US Government and the major R&D universities have agreed that when all US Fraunhofer style Institutes involving foreign firms are being formed in the future, the major US Government R&D funding agencies will be informed informally. The university will advertise the formation of the institution to see if any American firm is interested. If an American company is interested, they will be included on similar terms as the foreign company.

9/9/94 11:15 AM

Universities (US and EU), Eurolaser, US Government, Infomatics

The organizations will enter into a collaborative effort in R&D on non-invasive human brain I/O with necessary signal processing. The effort will total $800M over 4 years.

9/9/94 11:45 AM

US State Government, Viewall

The US State Government shall provide land for 5 years (free lease for 5 years, with an option for 20 years after that). 0% prop. on building and equipment for 5 years, worker training for manufacturing employees for 10,000 employees by year 5. Totaling $75M state investment. Viewall agrees to spend $75M for a plant to be built to productize Infomatics display technology.

Final Round of Toolkit Investments and Outcomes

Successful Investments ($M)

Investment	Amount Invested	Partners / *other investors*
Non-invasive neural-based I/O for Samson	225	Infomatics, Eurolaser, EU Gov't
Consumption tax replaces income tax.	48.8	Infomatics, Mechatronics
Re-investment in Abusive shareholder suits on stock fluctuations are curbed by government action.	120	Infomatics
Reinvestment in, Government establishes interagency, joint industry-government, clean electronics initiative.	90	Infomatics
Total successful investments	**483.8**	

Unsuccessful Investments ($M)

None

Final Briefings

I. US Strategy
   - A. Leading role in Samson and underlying technology.
   - B. Collaborative relations with governments and private sector entities.

II. Roles of the US Government
   - A. Technology Policy.
   - B. Tax Policy.
   - C. Influence.
   - D. Loan Guarantees.
   - E. Negotiator.
   - F. Trade Policy.

III. Government Activities.
- A. Take advantage of ToolKit options.
- B. Other financial options.
- C. Tax laws.
- D. European and US agreements in advanced sensors and bio-displays.
- E. China agreement.
- F. Center of excellence in robotics.
- G. US access to “Fraunhofer-Like” institutes.

IV. ToolKit Policy Options Exercised.
- A. NEMI - Industrial led consortia.
- B. EPA 50% cost reduction.
- C. State work force training program.
- D. Modified Glass-Steagall act.
- E. NEMI National lab consortia.
- F. FASB fails.
- G. Eliminated abusive stockholder lawsuits.
- H. Passed a clean electronics initiative.

V. ToolKit Technical Options
- A. Robotic control.
- B. Packaging - 50% cost, weight, reduction.
- C. Simulation tools.

VI. Company Specific Actions:
- A. Infomatics.
  1. Rootska/Ukraine deal.
  2. Alliance with Mechatronics.
  3. China market access, guaranteed loan.
  4. NEMI - sponsored consortium with Europeans on advanced displays.
     Outcome : New factory for retinal displays.
- B. University Actions:
  a) Samson units for education from Infomatics.
  2. Center of excellence with industry, universities and government labs in robotics.
  3. Included in the US - European, brainwave project.
- C. State Action:
  1. Deal with Viewall for US location of factory.
- D. Beneficial outcomes:
  1. $400M annual income from NEMI project.
  2. Zero-deficit and reduction in national debt due to consumption tax.
  3. Strengthened the industrial base through:
     a) Samson international joint venture.
     b) Nirvana
- E. Status of US Government:
  1. No strong government to government ties between the US and Japan.
  2. Strong Asian position on China.
  3. Strong US position in developing display technology.

4. Blocked Japanese purchase of Infomatics.

Midday Analyst's Report Highlights

- Had no real strategy other than a statement that the US would be a major player.
- Extremely pro-business, unrealistically so.
- Very - proactive, but random and opportunistic.

ANALYST'S REPORT

The US Government Team

The team was composed of senior experienced people with mostly government affiliations or experience, plus two members with university affiliations. Early in the game it became apparent that the USG team was mostly concerned with industry issues. As a consequence, the two university representatives split off from the group; in effect becoming their own sovereign entity and negotiating with other groups in their own interest without regard to national interests. There are some interesting parallels with real life here.

The USG team had a little trouble getting started, but soon plunged into the game with a lot of energy, if not much strategy. A couple of strong characters began to shape the nature of the teams actions. I would say it could be characterized as an extreme desire to *win*. Winning was unconsciously defined as domination of the market for Samson-like devices by US owned companies, without regard to overall benefit to the domestic economy. The team, on balance, was extremely pro-business. They seemed almost willing to bet the country on US company dominance of the Samson market, even though it appeared to be only a market of about $4 billion. There were a couple of attempts by one or two members to inject broader policy and strategic issues into the discussion, but these were quickly lost in the urgency to move ahead with investment decisions and the enthusiasm for *winning*.

As an example of what I'm talking about, I got the feeling that the European team had developed a strategy that included seeking alliances with a requirement for high domestic European manufacturing content. The US response seemed to be a willingness to relax US domestic manufacturing requirements without seeking a quid-pro-quo as long as it was of benefit to US companies, not necessarily the US economy. The USG response to Japanese initiatives was not nearly so cooperative, and tended to focus, appropriately, on free-trade issues.

The USG team took further actions and made investments which were felt to benefit potential US company dominance of the market for Samson-like devices:

- Repeal of Glass-Steagall, now allowing US banks to make equity investments with depositor resources.

- Loan guarantees for an industry investment in capital facilities in China for manufacture of Samson-like devices.

- Enactment of a consumption tax, at least partially replacing corporate and personal income taxes.

- Rejection of proposed FASB rule regarding treatment of employee stock options in corporate treatment of profits and losses.

- Possible repeal of IRS rule 860 (830?) which tends to make R&D investments overseas more attractive than domestic.

The bottom line is that actions of the US Government were extremely sympathetic to needs of US industry, but there was little discussion or consideration of broader issues relating to the health of the domestic economy. That made the game exciting to play, but lacked the realism of a government impacted by diverse and sometimes conflicting interests. The lack of realism, however, didn't distract appreciably from highlighting issues of importance to the National Electronics Manufacturing Initiative.

Overall Observation of the Game

While I couldn't observe all aspects of the game, I was impressed with the broad representation you were able to attract to participate. It seemed people really got into it, and attempted to play roles which were realistic, and executed with enthusiasm. In brief, I found very little to criticize, and believe it was a very valuable contribution. I did note three things, which you might wish to consider in future games:

- After the initial investment round, there seemed to be insufficient time to consider feedback from the Green Team on investment results, thus limiting USG team's ability to develop a strategy for the next round. It might be useful to have a definite break after the first round, allowing the Green Team to develop feedback material, and for the US and other teams to develop their next strategies. Given limited time, this might be hard to do without extending the game into a third day. As people develop confidence in the Prosperity Game concept, this might be acceptable, however.

- Resources for investment seemed too plentiful, and desired investment results seemed too easy to achieve. Perhaps the odds on your dice roll program need to be tweeked. One of the consequences of this, if I'm right, seemed to be that the USG team didn't seem to have to confront the really difficult issues.

- It seems quite easy for the team to be overwhelmed by one or two strong individuals. While this is probably also true in the real world to some extent, and time available is a definite factor, it might be useful for the facilitators to play a somewhat stronger role in ensuring that divergent voices and views play a stronger role in the game. This would help to inject more realism into the game, but might detract from focusing on the really important issues.

Japanese Government Team

PREGAME SCENARIO

The most challenging roles, and often the most rewarding, are the least structured. Your team's role is designed to be one of these. It offers great opportunity for initiatives, some of which may be stimulated by the Toolkit options. Please, never resist the temptation to take initiative.

The Japanese Government team's goal is to promote Japanese political, social, military and economic agendas.

The recession is continuing. You are under continuing pressure to expand Japanese markets abroad. However, the US government is becoming increasingly concerned over the widening trade gap. MITI has been forced to reduce expenditures.

A rapidly emerging market for your products is China. However, recent Chinese government policies have human rights activists around the world talking about trade embargoes with China. The US Government is considering revoking Most Favored Nation status. The UN is meeting to talk about trade sanctions. OPEC ministers have been successful in raising crude oil prices by 50%.

Issues and Policy Options

1) Decide on MITI-sponsored low-power CPU development with Horioka.

2) Help develop super capacitors as an alternative to batteries with MITI initiative.

3) Negotiate with US government a mutual interdependency agreement that would stall US initiatives in 3-D displays and intelligent machines for manufacturing

4) Prepare and present a Japanese proposal for Japan-US Free Trade Agreement or European-Japan Free Trade Agreement or both.

5) Deal with widening trade gap with the US.

6) Establish policy on China.

7) Decide to continue or expand investment in 3-D displays.

8) If asked, decide on allowing or disallowing any company purchasing or being purchased by another company.

9) Discuss your own options.

Other Opportunities

Examine the Technology and Policy Toolkit and the Supplementary Material to stimulate initiatives for your team to push. Create a Technology Delivery System compatible with your culture.

RESOURCES AVAILABLE:

Your team initially has $500M to spend on making deals and investing in Toolkit Options. Additional funds, if needed, must be raised through borrowing from the Green Finance Team.

JAPANESE GOVERNMENT GAME PLAY

Strategy

I. International Strategy
   - A. Create and dominate the world marketplace based on education.
   - B. Create Foundation to foster educational initiatives and provide Samson (Horioka) products
   - C. Confidential - Generalized version of Gov't subsidies. schoolboards, etc.
   - D. Reduce trade barriers to Japanese goods in Europe and China.
   - E. Create cooperative agreements with foreign colleges and labs. (for worldwide technology acquisition).
   - F. Establish a wireless communications standard.
   - G. Confidential - Focus on government relations efforts to ensure influence over US and European state and national government decisions.

II. National Strategy
   - A. Cost share Horioka's high end development with money made available through banking incentives.
   - B. Create Government software initiative; sub-element with applications in education.
   - C. Establish a software repository.
   - D. Hire former Soviet Union software and laser talents.
   - E. Match J. companies technology Toolkit investments up to cash available.
   - F. Curriculum and course development to support Samson applications development.

Summit Topics

First Day Agreements

9/8/94 1:00 PM

Japanese Government, Horioka, Viewall

CONFIDENTIAL

The parties shall collaborate in investing in the development of 3-D FPD's for $150.00 each to the following amounts:

Japanese Government	$100M
Horioka	$100M
Viewall	$80M

Horioka can be a second source with rights to the technology. Viewall shall have first manufacturing rights.

9/8/94 3:35 PM

Japanese Government, Horioka

Horioka to start a 5 year super capacitor or high performance battery development.

Horioka will spend $25M per year, MITI - $25M per year.
The co-sponsored program shall involve Japanese Universities and address environmental concerns on battery end of life. The primary technology to be addressed is the high performance battery. MITI can invite other Japanese companies into a consortium and either increase the funding or reduce Horioka's share.

9/8/94 4:01 PM

Japanese Government, World Bank

The world bank extends a line of credit of $750M to the Japanese Government. Payment terms are 60 months, APR at Japanese prime.

9/8/94 4:13 PM

Viewall, Japanese Government

Viewall will invest $15M in bio-sensor technology, while the Japanese Gov't to fund $35M over 3 years

9/8/94 4:20 PM

Viewall, Japanese Government, Horioka

Viewall agrees to build facility and purchase equipment for the development and production of new 3-D displays. Contributions to the new facility are:

Viewall $37.5M
Horioka $37.5M
J. Govt. $75M

9/8/94 4:26 PM

Universities, Japanese Government, Horioka

US Universities to get 10,000 Samson units and $500K to deploy them. Horioka funds a Fraunhofer-like Institute in California at an annual cost of $30M (after 3rd year, with a start up level of $15M per year for 3 years). The Japanese Government funds basic research at several US and Japanese Universities at an annual cost of $20M; the topic of research is environmentally sensitive, cradle to grave, manufacturing and disposal. Topic of the Fraunhofer Institute is software engineering of system software for Samson. Basic research benefits electronics manufacturing (not just Samson) worldwide by reducing manufacturing costs annually to $500M. Applications to the Horioka machines increase the Horioka sales henceforth by 10%. The benefit of the Fraunhofer Institute to Horioka is to reduce time to market of next generation of Samson by one year.

9/8/94 4:30 PM

World Bank, Japanese Government

The world bank agrees to extend to the Japanese Government a $162M loan, cash against Japanese line of credit. LOC balance = $588M.

First Round of Toolkit Investments and Outcomes

Successful Investments ($M)

Investment	Amount Invested	Partners / *other investors*
Create Foundation to foster educational initiatives and provide Samson (Horioka) products	1240	
Reduce trade barriers to Japanese goods in Europe and China.	100	
Improve government relations through "strategic" investments	50	
Cost share Horioka's high end development with money made available through banking incentives.	250	
Curriculum and course development to support Samson applications development	200	
Total successful investments	**1840**	

Note Horioka, Schmidt, and the Japanese Government had a written agreement to partner in the investment in low cost 3-D FPD's. The Japanese Government agreed to support this effort at $100M. After the Japanese Toolkit investments were brought to the Green Team it was found that they invested several hundred million more than they were allowed. The Japanese Government then eliminated this investment, leaving Viewall with a much reduced market share. Viewall asked for a Green Team ruling, citing Viewall's extensive internal investments in displays. The Green Team decided to give Viewall a 55% market share in 3-D displays, Eurolaser with a 45% market share.

Unsuccessful Investments ($M)

Investment	Amount Invested	Partners / *other investors*
Create cooperative agreements with foreign colleges and labs. (for worldwide technology acquisition).	50	
Establish a software repository	10	
Guarantee bank loan to Japanese display industry	100	
Total unsuccessful investments	**160**	**130**

First Day End Briefing

- All successes will be shared with the world.
- Software development for educational programs.
- Have 3 agreements with US universities

- Helping Japanese companies in display development.

Second Day Agreements (After Rootska Announcement)

9/9/94 10:50 AM

Viewall, Japanese Government

The Japanese Government shall provide $50M, to be matched by Viewall for R&D development on:

1. Improvement in and to keep current, Viewall bio-sensors for improved performance of Samson,
2. Direct refined display with US and Japanese Universities.

9/9/94 11:27 AM

Japanese Government, Japanese Bank

Finance will lend the Japanese Government $550M to purchase (through a Keiretsu) 21,440,000 shares, @ $26.00/share, (5%) of Infomatics Inc.

9/9/94 11:41 AM

Japanese Government, Japanese Bank

Finance will provide $10M of cash against the Japanese Governments line of credit to be invested in an Indian software firm to counter Rootska's refusal of the Japanese proposal. This Indian firm shows excellent progress toward AI-based interfaces. As a result of further open-market operations, the line-of-credit to the Japanese Government has been increased by $200M to $778M.

Final Round of Toolkit Investments and Outcomes

Successful Investments ($M)

None

Unsuccessful Investments ($M)

None:

Final Briefings

- US Government threatened to let N. Korea have nuclear weapons if Japan did not cooperate with US
- Infrastructure to Support Education -- $440M:
  (Government funded to Japanese Companies)
  1. Establish a philanthropic, not for profit Institution to administer this educational program.
  2. Distribution network for SAMSON to Educational Institutions in the following regions: Asia, Europe, US, Japan (500,000 units to each region).
  3. Training of school personnel on hardware and software use. This includes provision of stipends and other motivations for educators to use these systems.
  4. Provide maintenance and service. (Distributed network in country.)

5. Distribute and upgrade the curricula and courses developed under separate Toolkit item ($200M).
6. Use as Beta test site for upgrades to the modular options and improvements. Provide limited final upgrades to each region to entice further purchase.
7. Anticipated benefits:
   By introducing high school level students to the SAMSON capabilities the long range expectation is that in-country businesses will become dependent on the units and that they will be used for entertainment and personal data keeping activities. The units will be modular allowing for purchasing of cellular communications upgrades, entertainment packages, business packages, and similar profitable activities.

- Hardware ~ $800M
  As part of the educational foundation program, the Japanese government is contributing $800M to buy two million SAMSON units (per year). Horioka is contributing $200M in addition to the above amount. The manufacturing cost of these low end units is $500 per unit, thus Horioka will be subsidizing $100 per unit in manufacturing costs.
  Benefits described under the Infrastructure to Support Education item, listed above.
- US University Investment-- $30M
  These moneys will be used to develop advanced applications software, both with a view towards entertainment and education, for the SAMSON unit. Exclusive licenses will result from this. Japanese companies will profit-from this investment by their ability to compete in the hardware market for both SAMSON units from Horioka and other units using Viewall displays.
- US University Investments $20M
  Sponsor university research in the United States to investigate potentially new and innovative environmentally-clean manufacturing techniques. Findings will be made part of the public domain. Japan expects to realize benefit from reduced waste disposal costs in all facets of manufacturing, part of which will be realized in the electronics manufacturing industry.
  Government Influence ($50M) and Trade Policy ($100M) Lobbying efforts and "subsidies" to key top government officials will be directed at ensuring that no serious trade issues evolve against the Japanese government and that European and Chinese markets are kept open for Japanese exports.
- Projects Executed by Japanese Companies, Backed by Japanese Government-- ($12M, $75M, $25M, $50M)
  These investments were made by Japanese Manufacturing Companies and the resultant revenues and profits are provided on the balance sheets of those companies. The effect on the Japanese Government is an increase in tax revenues, resultant from these increases in sales, such that the net effect of these investments is revenue neutrality.
- Investment in Indian Software Consortium -- $10M
  Software consortia will work with California-based software - development group to develop AI-based software comparable to that developed by ROOTSKA. This will provide an alternative path for Horioka's high end SAMSON software.
- Infomatics Investment-- $1100M
  Horioka and Viewall for investment in Infomatics stock.

Midday Analyst's Report Highlights

- Had only one Gov't visionary and he was moved to Rootska the second day. Rest were bent on creative solutions.
- Created in a vacuum without interactions with Japanese companies (Very un-Japanese).
- Talked to US Government only when they came to them.
- First industry contacts occurred about 2/3rds through the first day.
- Had no common Japanese vision.

ANALYST'S REPORT

How the Play Progressed/Overall Impressions

The Japanese government started the day as the schedule suggested discussing what the goals of the group should be. Each team member, listed by organization instead of by name, spent five minutes summarizing their approach.

Congress- Limited Domestic Market, dominance in the US and Europe. Help Japanese companies with ventures as requested. Follow a traditional Japanese role.

DOE- Develop a financial strategy; invest in Japanese companies. Spread money in the US Create an infrastructure to make us strong as a country. China should be our focus market. Use idea of education market to realize improved world image.

Univ.- Promote Japanese University participation with US Univs. and Japan companies Solve battery problems; concentrate on application software. Joint venture with the Ukraine. Joint venture with Infomatics on operating system.

ARPA- Weaknesses are in software. Promote world harmony and lift trade barriers. Low cost capital is important.

Nat'l Labs- Market for products is 10 years out. Do we have to accept the market projection curve? Lets modify it. Ukraine is a solid gem. Propose joint venture with National Labs and Univs.

With these as initial conditions, the group proceeded to develop a plan during the morning to create and expand market share.

The group began the day generating ideas to help the Japanese companies increase market share. The morning exercise was conducted without consultation with the companies it would be affecting. They immediately targeted education as a "grass-roots" entrance point into the underdeveloped SAMSON marketplace. They spent most of the first morning deciding how to spend all of the available budget money on ToolKit options that supported this virtually untapped market. It was interesting that, with the exception of a few options requested by the Japanese

companies, the government did not pay any attention to the ready-made ToolKit options. They concentrated their energies on developing new options that would open new markets.

The Japanese Government Team was late with their first ToolKit option submission because they spent additional time discussing the impact of each of the options and postponed to the last minute the structuring of the options into a format that the Green Team needed. Once submitted, the Green Team had to ask clarification that again delayed its implementation. The Green Team came back a second time when they discovered that the Japanese Government team exceeded their original allotted budget (this was known by the team and thought okay after consulting the rule book, asking a Green Team member, and prearranging a credit line with the bank). At this point, the submission being a total of two hours late, the Green Team was able to locate one member of the team (the group was in recess) and ask them to trim the budget. Unfortunately, one of the items, once dropped, forced the breaking of a written agreement with Viewall that severely disadvantaged them for the remainder of the game.

At the summit meeting, the primary Japanese option, after severe criticism from the Europeans and mild opposition from the Americans, was voted down. This was mainly due to a lack of lobbying (glad-handing with other governments) on the part of the Japanese government team and some confusion in its presentation at the Summit. This set the stage for a more intense resentment between the Japanese and European governments as Europeans, supported by the US, passed an option that was wide in scope and slanted against the Japanese. The tone set by these two incidences caused the Japanese Government to walk out of the Summit in protest. An underlying tone of Europe and the US against Japan loomed for the remainder of the game, reinforced by the fact that neither government visited the Japanese government for any reason during play.

Directly after the summit, the buy-out offer from a banking consortia for Viewall was presented and discussed. The government followed true Japanese tradition by allowing a maximum of 15% of the company to be sold to outside interests, but left the decision of whether or not to sell those shares to Viewall. Immediately after this decision was rendered, the US government visited to express their concerns. They attempted to link the sale of Viewall to the upcoming talks on military support in Korea, much to the shock and outrage of the Japanese Government. When questioned on this 'holding of hostage' of the Korean people, the Americans recanted their position and quickly left.

In the afternoon, the Japanese government team spent significantly more time talking to the Japanese company teams on how they could help. Of course, by this time, all of the ToolKit option money was spent. Although the bank was willing to extend a significant credit line (starting at $5B, dropping to $600M, and finally settling at $1.6B), the Green Team clarified that ToolKit options could not be purchased with credit.

On day two, the first two hours of the day were taken discussing how a deal could be made with Rootska. The first hour of these discussions were made in a vacuum, again, without consultation with the Japanese corporate teams. The second hour was invested with Horioka putting together a joint deal.

The rest of the morning was spent putting additional meat on the educational system plan (successful ToolKit option costing $1.24B from the first day) and making investments in Infomatics ($1.1B for 10% of the company in a joint deal with Horioka).

It was unfortunate that the educational system plan -- well thought out and very strategic -- did not make the impact that it could have because details of the plan were not forwarded from the Japanese government team to the Green Team until halfway through the second day. This, along with the trade barrier lifting between Japan and China, were the two gems of the Japanese Government team.

Direct Quotes

"We're the government, companies should come visit us [not the other way around]"

"Lend schools a basic SAMSON unit free of charge, hook the kids on the concept, and sell them on hardware and software upgrades."

"Horioka [Our Japanese companies] need to learn some respect. They don't seem to understand that we can fund a new company through consortia, and tax them [Horioka] out of business in a month."

"Locate manufacturing plants in small US states by setting up local educationally based grants and spread [influence] money to the Senatorial and Congressional representatives. The communities will support the concept and so will their representatives. [The States will take on the Feds]"

"Government doesn't have a product strategy, they have a regional agenda."

Big Picture Observations

The Japanese government was very hesitant to go out and talk to other groups, even its own companies. Although improved by the end of the game, most of the major decisions and discussions pursued by the government team did not involve a great deal of corporate interaction. The group quickly entered into deficit spending and invested in many things that might not have been characteristic of the government they were representing.

There was no interface at all with the European government, and no visits to the US government. The only interface with other countries was when the US Government visited twice. This severely handicapped the prospect of regional alliances and joint market sharing. Globalization did not occur because countries were not willing to interface with one another.

Some general observations were also noted that could positively influence future games. As with any game, there will always be problems with interpretation of rules, especially with multiple referees. The volume of information being submitted to the Green Team made it virtually impossible for them to keep up. Timely and accurate rulings and feedback from the Green Team are essential to effective strategizing. Updating company spreadsheets, determining market share,

etc. is also essential information if an effective strategy is to be developed. The proposed concept of having the news bulletins and company spreadsheets available as an on-line service on a local area network would be a great idea.

On the business side, there was little penalty incurred for investments made that were not accepted. If a group came up with some outrageous strategy or something that was just outside the bounds of what the Green Team found acceptable, there was no penalty against the company when the option was rejected. All of the investments were success oriented. One example that I thought would have been interesting is if after all of the teams spend a significant portion of their time strategizing on how to endear themselves to Rootska, it would have been interesting if Rootska turned out to be a ruse. Time and investment at risk. That's real life.

Finally, investment returns, tax revenue increases based on increased market share, penalties for not adhering to emerging environmental standards would all add more realism to the game. Penalties for not adhering to a ToolKit option (mandatory adherence) would be valid for some of the environmental options, at least.

European Government Team

PREGAME SCENARIO

The most challenging roles, and often the most rewarding, are the least structured. Your team's role is designed to be one of these. It offers great opportunity for initiatives, some of which may be stimulated by the Toolkit options. Please, never resist the temptation to take initiative.

The European Government team's goal is to promote European political, social, military and economic agendas.

Europe has been losing electronics manufacturing. Alliances and joint ventures with the US and Japan have ultimately resulted in production moving off the continent. German re-unification has seen a heavy build-up of the east with much resentment by the west. The non-high-tech countries of the EC are becoming less successful in technology despite large technology investments by the EC.

The US is considering trade sanctions against China after recent Chinese crackdowns on dissidents. Also the UN is considering sanctions.

There is growing unrest in Eastern Europe and the need for aid from the EC is increasing.

Issues and Policy Options

1) Decide on continued support for bio-sensors at Schmidt.

2) Decide on funding R&D on a new laser by Eurolaser with Schmidt as a possible partner.

3) Consider allowing a joint development/production agreement with Schmidt and Horioka or Infomatics.

4) Consider funding super capacitor R&D at a European laboratory.

5) Decide on supporting battery R&D at Schmidt.

6) Decide on allowing/denying a buyout of Eurolaser by US or Japan or on any company purchasing or being purchased by another company.

7) Prepare and present European proposal for European-US Free Trade Agreement or European-Japan Free Trade Agreement or both.

8) Discuss your own options.

Other Opportunities

Examine the Technology and Policy Toolkit and the Supplementary Material to stimulate initiatives for your team to push. Create a Technology Delivery System compatible with your culture.

RESOURCES AVAILABLE:

Your team initially has $500M to spend on making deals and investing in Toolkit Options. Additional funds, if needed, must be raised through borrowing from the Green Finance Team.

EUROPEAN GOVERNMENT GAME PLAY

Strategy

I. Industry led, government facilitated industrial policy.

II. Reduce unemployment and increase worker productivity through building manufacturing capability and increasing European capability in high value technology areas, including Samson.

III. Samson is also critical to European defense and economic security.

IV. Our policy is to ensure European pre-eminence in selected Samson technology.

V. Recognize the importance of inter alliances for full scale production of Samson technology, i.e. Consortium.

VI. A consortium consisting of the European firms of Eurolaser, Schmidt and European Universities has been formed with the financial and political backing of the European Governments. The purpose of the consortium is full development and implementation of Samson enabling technology in consumer, industrial, and military applications.

VII. In light of the desire to fuel growing alliance and relationships with Eastern Europeans and the European nations of the former Soviet Union, it is the intent of the consortium to do the following:

- A. Enter into a social and technology agreement with the Government of the Ukraine, specifically for the purpose of developing Samson technology.
- B. Funding for the agreement to be spent in the Ukraine will amount to $5M in the first year, with $1M going to Rootska for the development of Samson related technology.
- C. Through an exclusive license, Rootska and other Ukrainian entities will be invited to join the consortium.

VIII. To this end the European Governments will provide significant funds to the consortium to develop Samson technology.

Summit Topics

Intend to discuss inter-government and inter-regional continuing alliances.

First Day Agreements

9/8/94 Time unknown

EU Government, Schmidt, Eurolaser

The parties agree to form a consortium to develop Samson technology. The consortium shall be industry led and Government facilitated.

9/8/94 Time unknown

Eurolaser, EU Government

This is to codify that the EU invested $300M on behalf of Eurolaser (and was successful in this Toolkit option). Eurolaser now controls 45% of the global market. Displays are predominately manufactured in Europe.

9/8/94 4:27 PM

US Government, Infomatics, EU Government, Mechatronics

The US Government agrees to fund the formation and operation of a consortium for advanced displays (to include advanced retinal technology) organized, led and managed by Infomatics and Mechatronics, with support from university and Government laboratories, Eurolaser and Schmidt as well as other sources that may be identified later. Funding over the next 5 years of $100M per year. Investment of European companies and Government support is strongly suggested.

First Round of Toolkit Investments and Outcomes

Successful Investments ($M)

Investment	Amount Invested	Partners / *other investors*
Robotic controllers for precision alignment	115	Schmidt, *Infomatics, Mechatronics, US Gov't*
Packaging directly on display reduces costs and weight by 50%	150	*Mechatronics, Viewall, Us Gov't*
Process decreases failure rate of PCMCIA devices and lowers cost by 30%	160	
Simulation tools integrated into system that reduces design time from 15 to 4 months	70	Schmidt, *Infomatics, Viewall, US Gov't*
Inference engine for AI software allows adaptive learning in computer driven devices.	175	Schmidt
Improved feeding of thin laminate substrates improves yield by 30%	100	*Infomatics, Viewall*
High -resolution 3-D flat panel displays become available at $150.00 each.	300	Schmidt, *Horioka, Viewall*
Total successful investments	**1070**	

Unsuccessful Investments ($M)

Investment	Amount Invested	Partners / *other investors*
Ind/lab software family integrates design to delivery process.	100	Schmidt
Intelligent software increases worker productivity 6%	150	

0.2 micron precision assembly technology improves yield 30% and lowers cost.	130	Eurolaser
National lab increases RF data rate by 5x	180	
High-resolution 3-D retinal displays become available at $500.00 each.	210	
Total unsuccessful investments	**770**	

First Day End Briefing

- Assisting the EC in Samson technology.
- EC Consortium licensing Infomatics compatible products.
- Joint development consortium in EU and US on retinal displays.

Second Day Agreements (After Rootska Announcement)

9/9/94 Time Unknown

EU Government, World Bank

The EU Government has issued $250M in T-Bills to raise cash for investing in the EC Consortium for Science and Technology Development.

9/9/94 7:48 AM

EU Government, Eurolaser

The parties have agreed to each supply $10M to the European University system for advanced research in brain wave interface technology for Samson. Based on centuries of research in biology and medicine, 200 years of research in electro-magnetics and 75 years research in electronics, the technical universities of Europe have demonstrated in the laboratory the first machine-human interaction by brain waves. In the demonstration, human thoughts could be recognized by the computer and images generated by the computer were perceived by the individual wearing the interface. Further refinement is required"

9/9/94 8:36 AM

Eurolaser, EU Government

The EU Governments transfers the following Toolkit investments to Eurolaser:

Substrates/ thin film laminates (50% position)
Reduced cost display packages

9/9/94 8:36 AM

EU Government, Schmidt

The EU transfers the following Toolkit investments to Schmidt as part of the consortium:

Robotic Controllers
Failure rate of PCMCIA's
Rapid Prototyping
Inference Engine
Substrates/feed thin laminates (50% position)

9/9/94 8:59 AM

US Government, EU Government

The parties establish an MOU between the US and European Governments to establish collaborative institutes with locations in the US and Europe to develop bio-sensor controlled brain-wave communication between people and machines with an open access to all institutes by all participants. $10M initial funding from each Government.

9/9/94 9:24 AM

Ukraine Government, EU Government

The Ukraine Government accedes to the European Union, to achieve full membership in 2000.

9/9/94 10:33 AM

EU Government, Rootska

Rootska will join the European Samson Consortium. $100M will be provided to the Ukraine for infrastructure development of which $10M will be earmarked to be used by Rootska as it sees fit for Corporate Infrastructural development. Rootska will join the consortium following the signing of several other agreements currently being finalized. Rootska believes that these agreements will not affect its eligibility in the consortium.

Final Round of Toolkit Investments and Outcomes

Successful Investments ($M)

Investment	Amount Invested	Partners / *other investors*
Non-invasive neural-based I/O for Samson	200	Infomatics, Eurolaser, US Gov't
Total successful investments	**200**	

Unsuccessful Investments ($M)

None

Final Briefings

Midday Analyst's Report Highlights

- Laid out goals end to end that would create regional jobs.
- Never used metrics in their strategies for deal making.
- Spent most of their time in their room.
- Broke down into individual parties.
- Tried to work with EU companies.
- Had good leadership.

ANALYST'S REPORT

The basic European government strategy was to win the game which in this group's interpretation was for the European region to be dominant in Samson market share and technology. The actions were consistently Eurocentric with a bias against the Asian region. The Government team was more focused on achieving a self-reliant Europe than were its European industry partners. The Government team seemed most at ease with a situation where all components of technology and production would be present in Europe (preferably exclusively). The team was very accommodative towards European industry. In the extreme, this resulted in just giving $100's of millions of dollars in Government purchased ToolKit products to European industry for the simple promise of creating some jobs in Europe. The underlying strategies followed by the European team during the game were as follows:

1. Create a European-centered Samson consortia that would make Europe and European industry as dominant as possible.

2. Tie Rootska tightly to Europe since the Ukrainian company's technology was perceived as key to success from the start.

3. Have Europe win the game.

The European Government team started out its actions with a discussion of its overall goals. However, the pressures of time created by taking too long on generalities did not allow the group to develop definitive strategies to broadly respond to these goals. Instead, the team focused on game-winning tactics that were typically reactive to events at hand. Few agreements were reduced to writing in the early portion of the game. The European Government frequently fell into a "techie" decision-making role rather than focusing on policy. Perhaps this was the result of the fact that the team never clearly established what the role of government was supposed to be in the game. Because the actions were reactive, the team's process was frequently typified by the following:

1. "Lone rangering" by individuals

2. Hip-shooting in decision making

3. Crisis management style

4. Confusion because there was not a common strategy/value base for independent empowered actions. (The open-loop nature of the game seemed to exacerbate this situation since there was little real-time feedback on the group's actions)

An underlying issue with the group was the fact that some members of the team felt cut-off and that a government perspective was not being accurately reflected in decision-making and there was no real discussion for issues of substance. Two of the direct government members of the team seemed uneasy or withdrawn from the process, frequently being followed by the other more assertive team members.

In the end, the European team could be judged as successful because of its very accommodative stance toward European industry which in turn appeared to have been very successful. Little consideration was given to the ToolKit policy options since they were viewed as being mainly applicable to the United States. Given the unconstrained nature of this particular game session, it appears that all players could claim success. Europe would be no exception.

Rootska, Limited: Ukrainian Software Company

PREGAME SCENARIO

Company structure, assets, and context for decisions

You are a company of 25 software engineers/computer scientists with a total staff of 45. Most of your products are in games and entertainment. Your claim to fame is an interactive, mentally challenging game for PC's and Nintendo-like systems called Quadratures. You received $1M last year from Horioka in royalties for this game. However, the game is getting old and you expect significantly less in royalties this year. Most of your effort over the last 18 months has been in operating system development. You have devoted a 16-man effort in this AI software development. You have technology that could revolutionize the SAMSON product by giving the operating system a "human" appearance while still maintaining full compatibility with OSPC. You have tried to interest Infomatics and Horioka, but with little success. Several times you demonstrated your software, but were severely limited by the hardware testing platform and critical software bugs. Your company desperately needs financial support. You have many talented people who are being severely underpaid. Many are seeking jobs in the US and Japan.

Your office in Kiev desperately needs capital. You will require $1M in computer systems to complete your AI operating system development. Your key programmers have been seeking employment in the West and you will have to increase their salaries by at least 2X to keep them. You have annual revenues of $1.3M, which includes the royalties from Horioka.

Issues and Possible Business Decisions

1) Decide to continue the development of a new OS or go back to generating entertainment software.

2) Seek financial backing from Infomatics or Horioka.

3) Seek continual financial assistance from the state

4) Seek cooperation with the EC.

Other Opportunities

Examine the Technology and Policy Toolkit for Initiatives for your team to push.

Green Team: Game Control and Finance

PREGAME SCENARIO

The Green Team has two major components, finance and control. The Finance Team is responsible for lending money to other industry and government teams.

When approached by the other teams, Finance should decide whether or not to lend the requested money, at what interest rate, and over what period for repayment. They may request justification for the loan, or various assets as collateral, including part ownership of a company. They can be either proactive or reactive. However, please remember the game context; requests for extensive business plans are not practical in the time available. Finance will have available to it the balance sheets and operations statements for all companies (included as an attachment here). Providing financial support to governments is up to the discretion of the team. It may be reasonable to choose roles based on countries; i.e., one or more persons for the US, one or more for Japan, and one or more for Europe. Finance team members may negotiate separately or as a group. Taking the initiative is strongly recommended.

Each company has been assigned a stock price and a number of outstanding shares. These prices should be considered fixed for the duration of the game, in the event that one team decides to purchase another and requires financial support.

The Control Team represents the rest of the world: including the people of each country or region, consumers, the news media, voters, environmentalists, human rights activists, labor unions, other governments and industries, etc. Control also performs as judge and jury in resolving disputes and answering questions, as well as performing the necessary probabilistic calculations of various outcomes. Control is also the clearing house for all game information including negotiations, summit plans, etc.

FINANCE

Finance Team Philosophy

At the opening of play, the team members felt individually tied to a perceived role within the confines of their geographic affiliations. Chuck Wessner tried to demonstrate how American banks would respond to a demand for risk capital with high required rates of return and relatively low patience. Kris Boom was influenced by the Japanese government and industry partners to deal exclusively within the established keiretsu structure, at low rates of return and with a relatively high patience of capital. Charlie Hoke, true to form to the EEC, was somewhere loosely in the middle of these two extremes.

As play progressed it became intuitively obvious that partnerships were forming across geographic boundaries and that to be a player in the core of game, we needed to match our lending philosophies to the forming global marketplace. Two actions were initiated to move us into a more global position and a more active status as players:

1.) Traditional regional roles were compromised in favor of a pooling of 25% of our collective funds to form World Bank Equities, whose charter was deemed to allow more aggressive funding

of global opportunities and to capitalize on the freedom to hold equity positions in companies which was granted to us by the successful repeal of Glass-Steagall.

2.) Our first action after formation of World Bank Equities was an open market move to acquire majority shares of Viewall, whose technology holdings we found pivotal to maximizing our return. This move would also afford us true player status for future negotiations.

Money Flow Considerations

There was too much money in the game. There are always resource constraints on goal maximization. The lack of monetary constraints on the major players resulted in the Finance Team feeling bored and underutilized during the game. It also allowed the major players to establish straddle positions around all possible teaming scenarios, and to remain in the more primitive thought process sectors [AND/AND & OR/OR], rather than progressing to more advanced [IF/THEN & IF AND ONLY IF] scenarios.

Perception 1. - Significant Government Support of Industry Initiatives

In the real world, governments spend significant time and dollars on social programs and not on industry initiatives. The play seemed skewed toward government support of enabling technologies, which meant that very little private financing of industry activities was occurring. The lion's share of moneys available from the Japanese banking community were absorbed by the Japanese Government, for example.

Recommendation:

Establish a limit (%) of available funds that each government may earmark for support of industry initiatives. This should drive the financing back to private sources.

Perception 2. - Marketshare May Be Too Important

Marketshare doesn't mean anything unless you are profitable. Too much of the play is focused on technology bartering since the most advanced Samson is perceived to capture the largest marketshare. In reality, the financial health and profitability of the players should be the score keeping element.

Recommendation:

Incorporate time segments into the play, and provide the teams with updated financials (balance sheets/income statement/cash flow) at these intervals. Teams deploying leading-edge technologies will need to recoup R&D costs, for example. The cash flow statement is currently not used in the play of the game, and it can enable or disable the productivity of a business.

Perception 3. - Stock Prices Remain Fixed During Play

Time is perceived as somewhat fluid during play, but many events occur which would have significant impact on the stock price of the companies. Fixing the stock prices at the opening of play and maintaining them for the entire game is unrealistic.

Recommendation:

By incorporating the time segments recommendation in [2.] above, updated stock prices could be calculated and provided as well.

Perception 4.- Finance Team Wins Vicariously

There is no impedance to money flow for the Finance team. Without a financial score keeping element in the game, it becomes evident early in play that the only win for a Finance team member is vicariously through industry team technical accomplishments.

Recommendation:

By introducing a better business-based score keeping system through implementation of [3.] and [4.] above, there is merit for Finance team members to assess their own investment strategies and turn down deals to protect the financial health of their institutions. This maps over well to real world scenarios.

Perception 5.- No Regional Differences in the Cost/Availability/Patience of Capital

A very real difference exists between the represented regions in the cost, availability, and patience of capital. This is often characterized in somewhat cliché terms as the "US focus on short-term returns", vis-à-vis the Japanese longer term focus on critical markets. The introduction of this concept to the play could provide some very interesting insights to the kinds of outcomes we read about daily in the Wall Street Journal. It is a crucial lesson for the players, and in fact, speaks to the larger issue of the economy as an instrument of state power.

Recommendation:

Brief the Finance team members on how to behave given their traditional approaches to cost/availability/patience of capital. The strong link between government and industry in Japan is facilitated by a banking system which follows the lead of the industrial initiatives. US bankers would respond more in keeping with the impedance of money flow concept presented in [5.] above.

II heard comments that the Green Team openness to write-in options and policy changes mid-play should be limited. I don't agree with those comments. I believe that the element of chaos introduced is very real world and you are to be commended for creating that particular environment.

APPENDIX G. MECHATRONICS SCORING						
Key challenges	**Strategy**	**Move 1**	**Move 2**	**Move 3**	**Move 4**	**Move 5**
Lexington (semiconductor equipment operation) financial troubles.	Get a commitment from US Government to fund Mechatronics if Mechatronics can find a big customer for their product; develop strategic alliances/partnerships with industry, gov't, universities, etc.	Summit Topic: Support manufacture on US soil (local content). 1,0,0	Mechatronics grants to Infomatics exclusive rights to purchase Robo-APS equipment and all upgrades thereto as applied to all Samson class products; Infomatics will pay the greater of $10M per year or 25% of Samson Division EBIT for years 8-20. 2,0,0	Mechatronics & Infomatics agree to cross license technologies acquired under the round 1 Toolkit options; each party the right to exercise the joint assets assigned to both parties as granted by the Green Team under round 1 Toolkit options. 3,1,0	The US Government agrees to fund (5 years of $100M/year) the formation and operation of a consortium for advanced displays (to include advanced retinal technology) organized, led and managed by Infomatics and Mechatronics, with support from univ. 4,0,0	
Lexington (semiconductor equipment operation) financial troubles.	Raise $200M.	US Bank agrees to loan Mechatronics $100M at LIBOR interest rate. First 2 years interest only due, paid quarterly. Loan has a renewal option in 5 years. Additional $100M is committed with an equity option, if the Glass-Steagall Act is repealed. 2,1,0	Toolkit Investments: Glass-Steagall Act is repealed 2,1,0	Confidential Agreement: The US Bank shall purchase $35M equity in Mechatronics at $7.50 per share. 3,1,0	Confidential Agreement: The US Bank will extend a $65M loan to Mechatronics, renewable at LIBOR. 4,0,0	
Lexington (semiconductor equipment operation) financial troubles.	Determine interest and benefit to industry. Provide competitive/cost advantage to users.	Summit Topic: International partners don't dump competitive products in the US. 1,0,0	Summit Topic: Obtain equal access to foreign markets. 2,0,0	Mechatronics grants to Info. exclusive rights to purchase Robo-APS equipment and all upgrades thereto as applied to all Samson class products; Infomatics will pay the greater of $10M per year or 25% of Samson Division EBIT for years 8 to 20. 3,1,0	Motorola will purchase $100M of wafer handling equipment for new plant pending satisfactory installation. Motorola will buy wafer handling equipment for its next 3 plants . Valued at approx. $400M. 4,0,0	Mech. will supply Eurolaser with a turn-key, state-of-the-art display manufacturing facility in Europe for $180M. Mechatronics will supply Eurolaser with upgrades at the lowest price offered to other purchasers. 5,0,0

Key challenges	Strategy	Move 1	Move 2	Move 3	Move 4	Move 5
Lexington (semiconductor equipment operation) financial troubles.	Leverage business base, e.g. automotive robotics business.	Mechatronics shall supply Schmidt with production equipment for non-Samson type product applications, in particular automotive applications to upgrade of the Munich plant (1996) and construct a new $200M plant in Mexico (1997). 2,0,0				
		Dell-Webb will build a retirement community. Mechatronics will provide automation equipment for homes. AARP will support sales to members. Mechatronics will receive $50M to cover plant costs. 1,0,1				
Technology development.	Continue SEMATECH funding and establish Mechatronics as "best of breed."					
Technology development.	Technology roadmap needed to benefit our partners/allies.					
Technology development.	Become leading edge, global, robotics supplier.	Summit Topic: Make sure that international partners respect US intellectual property rights. 1,0,0	Toolkit Investments: Robotic controllers for precision alignment 2,0,0	Mechatronics & Rootska agree to create a subsidiary for technology advancements for robotics with artificial intelligence that will increase the speed of robotics capability by 35% and includes exclusive rights of Rootska's AI software for robotics. 3,1,0	Schmidt makes available to Mechatronics the inference engine on a non-exclusive basis free of charge and Mechatronics upgrades the two contracted projects (upgrade of the Munich plant, and the new plant in Mexico) free of charge. 4,1,0	

Key challenges	Strategy	Move 1	Move 2	Move 3	Move 4	Move 5
Technology development.	Develop strategic alliances/partnerships with industry, government, universities, etc.	Mechatronics & Infomatics agree to cross license technologies acquired under the round 1 Toolkit options; each party the right to exercise the joint assets assigned to both parties as granted by the Green Team under round 1 Toolkit options. 2,1,0	The US Government agrees to fund (5 years of $100M/year) the formation and operation of a consortium for advanced displays (to include advanced retinal technology) organized, led and managed by Infomatics and Mechatronics, with support from univ. 2,1,0	A $66.7M tax rebate was donated to the US Government to open the Robotics Technical center of Excellence in conjunction with the national labs, universities and industry. 3,1,0		
		Schmidt makes available to Mechatronics the inference engine on a non-exclusive basis free of charge and Mechatronics upgrades the two contracted projects (upgrade of the Munich plant, and the new plant in Mexico) free of charge. 2,1,1				
Technology development.	Diversify into related new markets, building on core competencies.	The US Government agrees to fund (5 years of $100M/year) the formation and operation of a consortium for advanced displays (to include advanced retinal technology) organized, led and managed by Infomatics and Mechatronics, with support from univ. 2,1,0	Toolkit Investments: Packaging directly on displays reduces costs and weight by 50% 2,0,0	Mechatronics will supply Eurolaser with a turn-key, state-of-the-art display manufacturing facility in Europe for $180M. Mechatronics will supply Eurolaser with upgrades at the lowest price offered to other purchasers. 3,0,0		

Key challenges	Strategy	Move 1	Move 2	Move 3	Move 4	Move 5
Technology development.	Diversify into related new markets, building on core competencies.	Mechatronics shall supply Schmidt with production equipment for non-Samson type product applications, in particular automotive applications to upgrade of the Munich plant (1996) and construct a new $200M plant in Mexico (1997). 1,0,1	Schmidt makes available to Mechatronics the inference engine on a non-exclusive basis free of charge and Mechatronics upgrades the two contracted projects (upgrade of the Munich plant, and the new plant in Mexico) free of charge. 2,1,1			
Technology development.	Diversify into related new markets, building on core competencies.	Dell-Webb will build a retirement community. Mechatronics will provide automation equipment for homes. AARP will support sales to members. Mechatronics will receive $50M to cover plant costs. 1,0,0				
Technology and Policy Toolkit for Initiatives for your team to push.	With partners determine Toolkit options for investment.	Robotic controllers for precision alignment with Infomatics, US Gov't. 2,0,0	Mechatronics & Infomatics agree to cross license technologies acquired under the round 1 Toolkit options; each party the right to exercise the joint assets assigned to both parties as granted by the Green Team under round 1 Toolkit options. 2,1,0			

Key challenges	Strategy	Move 1	Move 2	Move 3	Move 4	Move 5
Technology and Policy Toolkit for Initiatives for your team to push.	With partners determine Toolkit options for investment.	Packaging directly on displays reduces costs and weight by 50% with US Gov't 2,0,1	Mechatronics & Infomatics agree to cross license technologies acquired under the round 1 Toolkit options; each party the right to exercise the joint assets assigned to both parties as granted by the Green Team under round 1 Toolkit options. 2,1,1			
Technology and Policy Toolkit for Initiatives for your team to push.	With partners determine Toolkit options for investment.	Glass-Steagall Act is repealed with Infomatics, US Gov't. 2,1,0	Consumption tax replaces income tax with Infomatics, US Gov't 2,2,0			

APPENDIX H - GLOSSARY OF TERMS

AI	Artificial Intelligence (for computer programming)
ARPA	Advanced Research Project Agency
ATP	Advanced Technology Program
CAE	Computer-Aided Engineering
CIT (CCIT)	Civilian Industrial Technology Committee, Mary Good, DOC, chair; Martha Krebs, DOE, co-chair. Subcommittees: Automotive Technologies (Mary Good chair), Electronics (Lance Glasser, ARPA), Construction and Building (Richard Wright, NIST, and Arthur Rosenfeld, DOE), Materials Technology (Lyle Schwartz, NIST), Manufacturing Infrastructure (Joseph Bordogna, NSF)
COC	Council on Competitiveness
CPU	Central Processing Unit
DRAM	Dynamic Random Access Memory
EBIT	Earnings Before Income Taxes
EC	European Community
ESC	Electronics Subcommittee, Dr. Lance Glasser, ARPA
ESPRIT	A funding agency of the European Community similar to ARPA. All EC countries supply funds to ESPRIT, which then funds research in several areas.
GATT	General Agreement on Tariffs and Trade
GUI	Graphical User Interfaces
Keiretsu	Japanese business philosophy developed after World War 2 and based on the concept of family relationships; the keiretsu system is an interlocking network of business contacts generally closed to outsiders.
LIBOR	London Interbank Option Rate
MCC	Microelectronics Computer & Technology Corporation
MEP	Manufacturing Extension Partnership, funded under NIST.
MITI	Japanese Ministry for International Trade and Industry.
MOE	Japanese Ministry of Education, Science, and Culture
NAFTA	North American Free Trade Agreement
NCAICM	National Center for Advanced Information Components Manufacturing, joint ARPA/DOE project; Jim Jorgensen is NCAICM Director
NEC	National Economics Council, Tom Kalil director
NEMI	National Electronics Manufacturing Initiative
NII	National Information Infrastructure
NIST	National Institute of Standards and Technology
NSTC	National Scienceand Technology Council (replaces FCCSET); newly formed presidential council headed by President Clinton.
NSF	National Science Foundation
OEM	Original Equipment Manufacturer
OIDA	Optoelectronics Industry Development Association, executive director David Cheney
ORD	Office of Research and Development - EPA
OS	Operating System (for computers)

OSPC	PC Operating System (Developed by Infomatics)
OSTP	Office of Science and Technology Policy, headed by John Gibbons
OTA	Office of Technology Assessment
OTP	DOC Office of Technology Policy
PCMCIA	Personal Computer Memory Chip International Association
RF	Radio Frequency
Robo-APS	Mechatronics' new Automated Packaging System
SBIR	Small Business Innovation Research
SEMATECH	Joint industry/government consortium formed in 1987
SIA	Semiconductor Industry Association, US industry formed in 1977
SRC	Semiconductor Research Corporation, SIA's first initiative, formed in 1981.
STTR	Small Business Technology Transfer
Super capacitors	Capacitors with very high energy densities, capable of being recharged in a short time (minutes); a possible high technology alternative to batteries.
TRP	ARPA Technology Reinvestment Project
VLSI	Very Large Scale Integration